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PAUL C. FREER, M. D., PH. D.

WITH THE COÖPERATION OF

E. D. MERRILL, M. S.; F. W. FOXWORTHY, PH. D.
C. B. ROBINSON, PH. D.; H. N. WHITFORD, PH. D.

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THE PHILIPPINE

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VOL. V MAY, 1910 No. 1

AN ENUMERATION OF PHILIPPINE LEGUMINOSAE, WITH KEYS TO THE GENERA AND SPECIES.

By E. D. MERRILL.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

This family ranks second or third in number of species among those represented in the Philippines, being definitely exceeded only by the *Orchidaceae*. It seems probable, when our material of the *Rubiaceae* is carefully revised, that the latter family will somewhat exceed *Leguminosae* in the number of species found in the Archipelago. A rough estimate of the former, based on the classified and unclassified material available here, brings the number of species approximately to the same figure as *Leguminosae,* but novelties are much more numerous in *Rubiaceae* than in *Leguminosae,* and the species appear to be more local. The introduced element in *Leguminosae* is comparatively large, but in *Rubiaceae* there are relatively few introduced forms.

An attempt has been made in the following enumeration to account for all the genera and species of the family that have been credited to the Philippines in botanical literature; to determine, so far as possible, those which really extend to the Archipelago, excluding the forms erroneously credited to the group by various authors, and to classify the abundant material accumulated in the herbarium of this Bureau during the past few years, describing the apparently new forms.

The material available for study comprises a complete set of all the collections made by employees of this Bureau, and the Bureau of Forestry, as well as numerous other collections of recent date, some of Cuming's Philippine plants, and occasional specimens collected by Mr. Loher. Opportunity has occurred, previous to the inception of this work, of examining the Philippine material collected by Cuming, Vidal, Loher, and others, preserved in the Kew Herbarium, as well as various Philippine

types in the United States National Herbarium, the Berlin Herbarium, DeCandolle Herbarium, and Philippine material in some other institutions.

A considerable amount of work has been done in the past on Philippine *Leguminosae,* so that in the great quantity of material examined, I have found it necessary or expedient to describe as new, only a single genus, twelve species, and a few varieties. A number of complicated cases of synonymy were encountered, some of which I have not as yet been able to solve in a satisfactory manner. In accordance with the rules of priority approved by the Vienna Botanical Congress, a certain number of changes have become necessary, and in most cases the earliest valid name has been adopted, both in genera and species, except in the case of the former, where the list of *nomina conservanda* of the Vienna Congress has been accepted.

A tabulated list is given below of the retained generic names, as approved by the Vienna Congress, and also the rejected ones, so far as this affects Philippine *Leguminosae.*

Retained names.	Rejected names.
Crudia Schreb. (1789)	Apalatoa Aubl. (1775).
	Touchiroa Aubl. (1775).
	Waldschmidtia Scop. (1777).
Pterolobium R. Br. (1814)	Cantuffa J. F. Gmel. (1791).
Peltophorum Walp. (1842)	Baryxylum Lour. (1790).
Ormosia Jack (1811)	Toulichiba Adans. (1763).
Tephrosia Pers. (1807)	Cracca L. (1753).
	Colinil Adans. (1763).
	Needhamia Scop. (1777).
Clianthus Banks & Soland. (1832)	Donia G. Don (1832).
Ormocarpum Beauv. (1804)	Diphaca Lour. (1790).
Smithia Ait. (1789)	Damapana Adans. (1763).
Desmodium Desv. (1813)	Meibomia Adans. (1763).
	Pleurolobus St. Hil. (1812).
Alysicarpus Neck. (1790)	Fabricia Scop. (1777).
Dalbergia L. f. (1781)	Amerimnon P. Br. (1756).
	Ecastaphyllum P. Br. (1756).
Pongamia Vent. (1803)	Pongam Adans. (1763).
	Galedupa Lam. (1786) (quoad descr.).
	Pungamia Lam. (1797).
Derris Lour. (1790)	Salken Adans. (1763).
	Solori Adans. (1763).
	Deguelia Aubl. (1775).
	Cylizoma Neck. (1790).
Centrosema Benth. (1838)	Bradburya Raf. (1817).
	Vexillaria Hoffmg. (1824).
Mucuna Adans. (1763)	Zoophthalmum P. Br. (1756).
	Stizolobium P. Br. (1756).
Rhynchosia Lour. (1790)	Dolicholus Medic. (1787).
Pachyrrhizus Rich. (1825)	Cacara Thou. (1805).
Psophocarpus Neck. (1790)	Botor Adans. (1763).

In the above list the 18 retained names given in the first column would be displaced by the older ones, given in the second column, were the principles of priority to be applied without reservation. The author does not personally approve of all the retained generic names, and it is believed that in a number of cases better results would have been secured had the list been made up with more discretion. The list will not bear close inspection without showing its deficiencies, both in names included, and in those omitted. The method by which these names were selected appears to have been purely arbitrary, with little or no consideration of the facts in the individual cases, and it is believed that, granting a list of *nomina conservanda* to be expedient and necessary, better results would have been secured, had a proposed list been adopted by the Vienna Congress, for definite acceptance or rejection at the next International Botanical Congress, thus giving opportunity for some discussion of the proposed names, arguments for and against the adoption of certain ones, and opportunity to propose additions to the list.

In the *Leguminosae* of the Philippines alone, similar action should have been taken in the case of several genera, in order to have made the list of *nomina conservanda* consistent. *Entada* Adans. (1763), should have been retained instead of *Pursaetha* L. (1747), *Gigalobium* P. Br. (1756), or *Lens* Stickm. (1754); *Sesbania* Scop. (1777), instead of *Sesban* Adans., or *Agati* Adans. (1763); *Sindora* Miq. (1860), instead of *Galedupa* Lam. (1786); and possibly also *Dalea* L. (1737), instead of *Parosela* Cav. (1802), although the last case is complicated by synonymy and homonymy. If, as in the list of *nomina conservanda, Clianthus* be given preference to *Donia,* then for the sake of consistency, *Atylosia* should have been retained in place of *Cantharospermum,* yet on the one hand *Clianthus* is given preference to *Donia,* and on the other *Cantharospermum* is preferred to *Atylosia,* although in both cases there is only page priority, and in the last case *Atylosia* is certainly the more generally used name.

In the following consideration generic limits as defined by Bentham in the "Genera Plantarum," and by Taubert in Engler and Prantl's "Die natürlichen Pflanzenfamilien" have been followed, and the sequence of genera followed is that of the latter work. In studying the Philippine material, as well as the extra-Philippine plants in this herbarium, I have been impressed with the inequality in the treatment of genera by the above authors. Especially in the *Papilionatae* one finds genera separated by exceedingly slight and often obscure characters, as with *Dunbaria* and *Cantharospermum, Vigna* and *Phaseolus,* and, as some authors propose, the separation of *Lablab* from *Dolichos* as a distinct genus. In the cases just cited, the characters considered worthy of being the bases of generic distinctions, are certainly not as strong, nor as well defined, as are those by which various sections or subgenera of *Caesalpinia, Cassia, Bauhinia,*

Desmodium, Mucuna, etc., are distinguished, yet the movement by some botanists again to raise certain groups of species, in the above and other genera, to generic rank, meets with comparatively little support. The author is personally of the opinion that it would be more logical and practically as convenient, to divide some of the larger genera into several smaller ones, where the sections or subgenera are sharply defined as are some of them in *Caesalpinia, Cassia, Desmodium,* etc. For purposes of comparison, however, generic limits as defined by Bentham and by Taubert are retained in the present paper.

Generic nomenclature in the present enumeration differs from that of De Dalla Torre & Harms "Genera Siphonogamarum" only in two cases, these being the adoption of *Delonix* Raf. for *Caesalpinia* auct., non L., and *Parosela* Cav. for *Dalea* L., for what are considered valid reasons.

The only previous attempt to enumerate all the species of this family known in the Philippines was by F.-Villar,[1] who credited to the Archipelago 78 genera and 229 species. Of these, it has been necessary to exclude 6 genera and about 35 species, as no material is extant by which F.-Villar's identifications can be checked, and the excluded genera and species have not been found in the Philippines by any preceding or succeeding botanists.

In the present enumeration 90 genera are considered. Of these, two, *Monarthrocarpus,* described as new, and *Luzonia,* are monotypic and endemic; the former allied to *Desmodium* § *Podocarpium,* and the latter to *Dioclea.* Of the 90 genera included, 14, *Enterolobium, Leucaena, Schrankia, Mimosa, Prosopis, Tamarindus, Delonix, Medicago, Gliricidia, Arachis, Pisum, Centrosema, Pachyrrhizus,* and *Psophocarpus,* are represented in the Philippines by introduced species only, while in other genera, such as *Cassia, Crotalaria, Desmodium,* etc., there are many introduced forms.

The number of species recognized is 285, with several varieties, and this list will doubtless be somewhat increased as exploration progresses. Of these 285 species I consider the following 53 to have been introduced, although most of them are now thoroughly naturalized and must be considered as constituents of the Philippine flora: *Enterolobium saman,* Pithecolobium dulce,* Albizzia lebbeck, Acacia farnesiana,* Leucaena glauca,* Schrankia quadrivalvis,* Mimosa pudica,* Prosopis vidaliana,* Cynometra cauliflora, Tamarindus indica* (prehistoric), *Bauhinia tomentosa, B. monandra,* Cassia fistula, C. glauca, C. tora, C. hirsuta,* C. sophera,* C. occidentalis,* C. alata,* C. siamea, Delonix regia, Caesalpinia pulcherrima,* Crotalaria juncea, C. incana,* Medicago denticulata, M. sativa, Trifolium pratense, T. hybridum, T. incarnatum, T. repens, Indigofera suffruticosa,* Parosela glandulosa,* Gliricidia sepium,* Sesbania*

[1] Nov. App. (1880) 57–76.

grandiflora (prehistoric), *Arachis hypogæa,* Desmodium scorpiurus,* D. procumbens,* Lourea vespertilionis, Inocarpus edulis* (prehistoric), *Pisum sativum, Centrosema plumieri,* Mucuna deeringiana, Canavalia gladiata,* Cajanus indicus, Phaseolus lunatus,* P. adenanthus,* P. semierectus,* P. radiatus, Vigna sinensis, Dolichos lablab, Pachyrrhizus erosus,* and Psophocarpus tetragonolobus.* Of these apparently introduced species, those marked with an asterisk are undoubtedly of American origin. It is interesting to note that of these 26 species which have, for most part, at least, originated in tropical America, the following have not as yet been reported from any other part of the Orient, although all, with the exception of the first, are very common and widely distributed in the Philippines: *Schrankia quadrivalvis, Prosopis vidaliana, Parosela glandulosa, Gliricidia sepium,* and *Desmodium scorpiurus.*

It is possible that other species than those listed above, now cosmopolitan in the tropics, have originated in tropical America, and it is also very probable that still others of these cosmopolitan species now considered as indigenous in the Philippines, have been introduced within historic times from other parts of Malaya or from Asia. This is especially likely of the constituents of the low country flora in the vicinity of towns, for in dealing with the flora of the settled areas it is frequently difficult to determine whether or not an individual species is really native or introduced.

One reason for considering that many of the plants found about towns and in cultivated areas in the Philippines are not really natives of the Archipelago, is found in the results obtained in the botanical exploration of Polillo, an island having an area of about 300 square miles, off the east coast of Luzon. Botanical work was carried on here, extending over a period of about four months, by Dr. C. B. Robinson in August, and Mr. R. C. McGregor from September to November, 1909. From a botanical standpoint the island is more interesting because of the species it lacks, rather than from those actually found there. Most of the species collected are of wide distribution in the Philippines and in the Indo-Malayan region generally, while novelties are comparatively rare. A striking character of the flora of the island, as a whole, is the lack of very numerous species, characteristic of the low country throughout the Philippines, weeds of cultivation, etc. Conditions are not lacking for the growth of these plants, for Polillo supports a population of about 3,000 inhabitants, and considerable areas are in cultivation and lying fallow. In *Leguminosae* alone, the following results were obtained: Total number of species collected or observed 27; of these but 2 are endemic in the Philippines, 21 are of wide Indo-Malayan distribution, including 8 strand plants, and only 5 are considered to be of American origin. The common leguminous weeds and various other plants, characteristic of waste lands of the low country, and for most part cosmopolitan in the tropics, are conspicuous by their absence. It has been

noted above that about 26 species of this family, found in the Philippines, are of American origin; it is worthy of note that but 5 of these have been found in Polillo. The fact that there are so few of these American plants definitely known from Polillo, leads us to conclude also that many of the other species, now cosmopolitan in the tropics, abundant in other parts of the Philippines, but wanting in Polillo, have been introduced into the Archipelago in comparatively recent times, perhaps contemporaneously with the introduction of many of the American species, and like the latter have not as yet reached the isolated parts of the Archipelago.

Some cases of geographical distribution are worthy of note, but evidence of special affinities with the flora of surrounding regions is not as strong in this family as it is in some others. The flora as a whole is preponderatingly Malayan. Excluding from the present consideration the species that manifestly have been introduced from tropical America, and are now for most part widely distributed in Indo-Malaya, we have about 150 common to the Philippines and the Malayan region; of these about 120 are common to India, the Philippines, and Malaya, and many also extend to other regions. About 31 are confined to the Philippines and Malaya, but less than one-half this number are common to continental Asia and the Philippines and do not extend to Malaya.

The following species extend from northern India to China and the Philippines: *Desmodium podocarpum* DC. (also in Japan), *D. retroflexum* DC., *Indigofera nigrescens* Kurz, *Lespedeza juncea* var. *sericea* Forbes & Hemsl. (also in Australia), *Shuteria vestita* W. & A., and *Smithia ciliata* Royle. From northern India and the Philippines, but not reported from China, we have: *Dolichos falcatus* Klein, *Crotalaria acicularis* Ham. (also in Java), *Desmodium pseudotriquetrum* DC., and *Crotalaria assamica,* while the genus *Kingiodendron* has one species in India, and one in the Philippines. Confined to China and the Philippines we have *Phaseolus minimus* Roxb., while *Gleditsia rolfei* Vid., Luzon and Celebes, and the only representative of the genus in Malaya, is closely allied to species of southern China, the genus not being represented in India except by introduced species. A considerable number of the above continental types are confined to the Benguet-Lepanto region in northern Luzon, in the regional distribution of *Pinus insularis* Endl., but others are widely distributed at low altitudes. *Acacia confusa* Merr., which has been identified by some authors with *A. richii* A. Gray, of Polynesia, is the only species, known to me, common and confined to Luzon and Formosa; however, this species must be considered an Australian type as it is one of the few extra-Australian species of the great group *Phyllodineae* so characteristic of that continent. *Desmodium buergeri* Miq., a Japanese species now reported from the Philippines, has been confused with *D. heterocarpum* (L.) DC., so that its exact range is uncertain.

Australian types are *Acacia confusa,* mentioned above, and *Clianthus binnendyckianus* Kurz, the genus with one species in Mindanao, Polillo, and Celebes, and two in Australia. An indication of a probable line of migration from Australia through the Philippines and intervening islands to southeastern Asia, or *vice versa,* is represented by *Glycine tomentosa* Benth., Queensland, Luzon, and China, and *Pycnospora nervosa* W. & A., Australia, Philippines (common and widely distributed), China, and India, but not known from Malaya, while the genus *Erythrophloeum* has one species in Australia, one in the Philippines, one in China, and is, so far as is known at present, wanting in Malaya and India, but has about five species in Madagascar and tropical Africa.

New Guinea and the Philippines have in common *Rhynchosia calosperma* Warb. (also in the Aru Islands and Bismarck Archipelago), and the genus *Macropsychanthus,* with one species in New Guinea, and two in Mindanao. The Celebes alliance is stronger, with the monotypic genus *Wallaceodendron, Dalbergia minahassae* Koord., *Pithecolobium subacutum* Benth., *Clianthus binnendyckianus* Kurz, and *Pterocarpus echinatus* Pers. (also in Salayer), while *Pueraria warburgii* Perk., of the southern Philippines, is represented in Celebes by an identical, or closely allied form. Special cases of distribution from other parts of Malaya are few. *Pithecolobium prainianum* Merr. appears to be known only from the Philippines, Borneo, and Java, *Cassia divaricata* Nees & Bl., Luzon and Java, *Mezoneurum latisiliquum* Merr., and *M. pubescens* Desf., Timor and the Philippines, as well as the typical form of *Parkia timoriana* Merr. *Spatholobus gyrocarpus* Benth. is known only from Luzon, Penang, and the Malay Peninsula (Perak), and *Desmodium ovalifolium* Wall. from Luzon, Sumatra, and Penang.

A notable characteristic of the Philippine flora as a whole, is the high percentage of endemic species, but endemism is not particularly developed in *Leguminosae.* Two genera, *Monarthrocarpus* Merr., and *Luzonia* Elm., both monotypic, and the following 82 species, are, so far as is known at present, confined to the Philippines: *Pithecolobium scutiferum* Benth., *P. pauciflorum* Benth., *P. mindanaense* Merr., *P. platycarpum* Merr., *Albizzia scandens* Merr., *A. acle* Merr., *Adenanthera intermedia* Merr., *Entada parvifolia* Merr., *Erythrophloeum densiflorum* Merr., *Cynometra inaequifolia* A. Gray, *C. warburgii* Harms, *C. luzoniensis* Merr., *C. simplicifolia* Harms, *Kingiodendron alternifolium* Merr. & Rolfe, *Sindora supa* Merr., *Intsia acuminata* Merr., *Pahudia rhomboidea* Prain, *Crudia blancoi* Rolfe, *C. subsimplicifolia* Merr., *Bauhinia dolichocalyx* Merr., *B. leptopus* Perk., *B. subglabra* Merr., *B. whitfordii* Elm., *B. cumingiana* F.-Vill., *B. nymphaeifolia* Perk., *B. perkinsiae* Merr., *B. aherniana* Perk., *B. antipolana* Perk., *B. merrilliana* Perk., *B. pinchotiana* Perk., *B. warburgii* Perk., *Pterolobium membranulaceum* Merr., *Mezoneurum mindorense* Merr., *Ormosia paniculata* Merr., *O. calavensis* Azaola, *Crotalaria*

radiata Merr., *Indigofera unifolia* Merr., *Psoralea badocana* Blanco, *Tephrosia dichotoma* Desv., *T. obovata* Merr., *Millettia longipes* Perk., *M. ahernii* Merr. & Rolfe, *M. canariifolia* Merr., *M. merrillii* Perk., *M. cavitensis* Merr., *M. foxworthyi* Merr., *Desmodium cumingianum* Benth., *D. quinquepetalum* Merr., *D. malacophyllum* DC., *Monarthrocarpus securiformis* Merr., *Dalbergia polyphylla* Benth., *D. cumingiana* Benth., *Pterocarpus blancoi* Merr., *Derris polyantha* Perk., *D. cumingii* Benth., *D. philippinensis* Merr., *D. micans* Perk., *D. mindorensis* Perk., *D. lianoides* Elm., *Erythrina stipitata* Merr., *Strongylodon macrobotrys* A. Gray, *S. elmeri* Merr., *S. zschokkei* Elm., *S. caeruleus* Merr., *S. crassifolius* Perk., *S. pulcher* C. B. Rob., *Mucuna curranii* Elm., *M. mindorensis* Merr., *M. longipedunculata* Merr., *M. aurea* C. B. Rob., *M. sericophylla* Perk., *M. lyonii* Merr., *Dioclea umbrina* Elm., *Luzonia purpurea* Elm., *Macropsychanthus mindanaensis* Merr., *M. ferrugineus* Merr., *Pueraria tetragona* Merr., *Dunbaria cumingiana* Benth., *D. merrillii* Elm., *Flemingia philippinensis* Merr. & Rolfe, and *F. cumingiana* Benth.

If we exclude the 53 species definitely known to have been introduced into the Philippines, considering the leguminous flora of the Philippines as comprising only the 232 indigenous, or presumably indigenous species, then the percentage of endemism for the family is slightly less than 36 per cent.

Tabulation of the Indo-Malayan genera and species has been omitted, because of the great number of genera and species involved. The summary is as follows: India, including the Malay Peninsula,[2] 147 genera and 1058 species; Malay Peninsula,[3] 73 genera and 291 species; Malay Archipelago,[4] 105 genera and 554 species; China,[5] 89 genera and 469 species; Formosa,[6] 56 genera and 136 species; Philippines, 90 genera and 285 species.

From an economic standpoint this family takes high rank in the Philippines. With the exception of the *Dipterocarpaceae,* no family compares with the *Leguminosae* in the quantity and value of its timber trees. All grades of timber are produced by various species of the family, from the very soft and low grade timber known as *cupang,* from *Parkia timoriana* (DC.) Merr., to the highest grade building and furniture woods found in the Archipelago. Among the more valuable

[2] Baker in Hook. f. Fl. Brit. Ind. **2** (1876–1878) 56–306; Prain in Journ. As. Soc. Beng. **66** [2] (1897) 347–518.

[3] Prain in Journ. As. Soc. Beng. **66** [2] (1897) 21–275.

[4] Boerl. Handl. Kenn. Fl. Nederl. Ind. **1** (1890) 321–419.

[5] Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886–87) 150–217; M. Smith ex Forbes & Hemsl. l. c. **36** (1905) 451–530.

[6] Mats. & Hayata in Journ. Coll. Sci. Tokyo **22** (1906) 102–117; Hayata l. c. **25** [19] (1908) 74–77.

timbers are *narra,* corresponding to the *padouk* of India, from *Pterocarpus indicus* Willd., and *P. echinatus* Pers.; *acle,* from *Albizzia acle* (Blanco) Merr.; *supa,* from *Sindora supa* Merr.; *ipil,* from *Intsia bijuga* (Colebr.) O. Ktz.; *tindalo,* from *Pahudia rhomboidea* (Blanco) Prain; *banuyo,* from *Wallaceodendron celebicum* Koord.; *batete* from *Kingiodendron alternifolium* (Elm.) Merr. & Rolfe, while many other species yield timber used locally for different purposes. Shade-trees and various ornamental plants are represented by *Enterolobium saman* (Jacq.) Prain, *Albizzia lebbeck* (L.) Benth., *Delonix regia* (Boj.) Raf., *Cassia siamea* Lam., *Peltophorum inerme* (Roxb.) Naves, *Sesbania grandiflora* (L.) Benth., *Caesalpinia pulcherrima* (L.) Sw., *Bauhinia tomentosa* L., *B. acuminata* L., *B. monandra* Kurz, *Erythrina indica* Lam., and others. Plants cultivated for food are *Phaseolus lunatus* L., *P. radiatus* L., *Vigna sinensis* Endl., *Arachis hypogea* L., *Pisum sativum* L., *Canavalia gladiata* DC., *Cajanus indicus* Spreng., *Pachyrrhizus erosus* Urban, *Dolichos lablab* L., *Psophocarpus tetragonolobus* (L.) DC., *Tamarindus indica* L., *Sesbania grandiflora* (L.) Pers., *Pithecolobium dulce* Benth., also yielding a valuable tanbark, and *Inocarpus edulis* Forst. Plants yielding dyes are represented by *Caesalpinia sappan* L., *Indigofera suffruticosa* Mill., and *I. tinctoria* L. Substitutes for soap, used in bathing, washing the hair, etc., are derived from *Albizzia saponaria* (Lour.) Bl., *A. acle* (Blanco) Merr., *Entada scandens* Benth., and *E. parvifolia* Merr. Various species of *Derris* are utilized for the purpose of stupefying fish. Extensively used hedge-plants are *Gliricidia sepium* (Jacq.) Steud., and to some extent *Leucaena glauca* Benth., the wood of the former also highly prized for making charcoal. *Gliricidia* and *Erythrina indica* Lam., are more or less utilized as shade trees in various plantations. A considerable number of species are utilized by the natives in their materia medica, while a great number are employed for various minor purposes.

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In the following keys to the genera, that part dealing with the *Papilionatae* has been made purely artificial in many respects. In the construction of the keys to both genera and species suggestions have been taken from the previously published works of various authors, modified by the forms dealt with in the following enumeration. In these keys only Philippine representatives have been taken into consideration.

KEY TO THE GENERA.

1. Petals valvate; flowers regular..... A. MIMOSOIDEAE
1. Petals imbricate; flowers irregular (nearly or quite regular in *Gleditsia*, trees with branched spines).
2. Flowers not papilionaceous, the upper petal interior..... B. CAESALPINIOIDEAE
2. Flowers papilionaceous, the upper petal (standard) exterior. C. PAPILIONATAE

A. MIMOSOIDEAE.

1. Calyx-lobes valvate.
2. Stamens many, at least more than 10, or more than twice the number of petals.
3. Filaments more or less connate (*Ingeae*).
4. Endocarp not distinct from the pericarp and not forming individual envelopes about the seeds.
5. Pods indehiscent, septate between the seeds.
6. Pod turgid, about 5 cm wide, the sutures not thickened; petals adnate below to the staminal tube, otherwise free.... 1. *Serianthes*
6. Pod scarcely turgid, spongy or fleshy, less than 2 cm wide, the sutures thickened; petals connate below into a tube. 2. *Enterolobium*
5. Pods dehiscent or indehiscent, not septate between the seeds.
6. Pods very strongly curved or twisted..... 3. *Pithecolobium*
6. Pods straight, not curved or twisted..... 4. *Albizzia*
4. Endocarp distinct and free from the pericarp, the latter not septate, the former septate between the seeds and forming an individual envelope about each seed..... 5. *Wallaceodendron*
3. Stamens free; inflorescence capitate (*Acacieae*)..... 6. *Acacia*
2. Stamens as many as or double the number of petals.
3. Anthers not gland-tipped.
4. Pods straight, flat, smooth, with continuous valves, dehiscing through the sutures; erect trees..... 7. *Leucaena*
4. Pods slightly curved or nearly straight, somewhat aculeate, with always persistent, indehiscent sutures; suffrutescent herbs or undershrubs.
5. Pods subcylindric, 4-angled..... 8. *Schrankia*
5. Pods flattened ..... 9. *Mimosa*
3. Anthers gland-tipped.
4. Seeds albuminous (*Adenanthereae*); erect trees or shrubs.
5. Spiny shrubs or small trees; pods indehiscent..... 10. *Prosopis*
5. Spineless trees; pods dehiscent..... 11. *Adenanthera*
4. Seeds exalbuminous (*Piptadenieae*); great climbers, usually tendril-bearing, with very large pods and seeds..... 12. *Entada*
1. Calyx-lobes imbricate (*Parkieae*); very large trees with capitate inflorescence. 13. *Parkia*

B. CAESALPINIOIDEAE.

1. Calyx entire, or the segments above the receptacle more or less united into a toothed or lobed tube.
2. Leaves 2-pinnate; stamens 10 (*Dimorphandreae*).
3. Erect, unarmed trees, with few, medium to large leaflets; flowers small; pods woody, not winged..... 14. *Erythrophloeum*
3. Scandent, usually armed shrubs, with many, usually small leaflets; flowers medium-sized; pods thin, winged down one suture (*Eucaesalpinioideae*). 28. *Mezoneurum*

2. Leaves simple, entire, 2-cleft, or divided to the base; stamens 10 or less; vines, shrubs, or trees ..... 22. *Bauhinia*

1. Calyx-segments free or nearly free above the receptacle (except in *Mezoneurum*).
   2. Leaves 2-pinnate, (except *Gleditsia*) (*Eucaesalpinioideae*).
      3. Leaves 1-pinnate, the leaflets crenulate, the trunk and larger branches with elongated, branched spines; flowers nearly regular..... 24. *Gleditsia*
      3. Leaves 2-pinnate; leaflets entire, spines, if present, simple; flowers irregular.
         4. Calyx-segments valvate; large trees with very numerous, small leaflets, and large, red and yellow flowers; cultivated only..... 26. *Delonix*
      4. Calyx-segments imbricate.
         5. Ovary 1-ovuled; scandent armed shrubs with the pod winged at the apex (samaroid) ..... 25. *Pterolobium*
         5. Ovary 2- to many-ovuled; scandent or erect, armed or unarmed, the pods not samaroid.
            6. Scandent or erect, usually armed; pods not winged. 27. *Caesalpinia*
            6. Scandent, usually armed; pods thin, winged along the upper suture. 28. *Mezoneurum*
            6. Erect, unarmed trees with subequal calyx-segments; stigma peltate; pod narrowly winged along both sutures..... 29. *Peltophorum*
   2. Leaves 1-pinnate or reduced to single leaflets.
      3. Anthers basifixed, opening by terminal pores; herbs, shrubs or trees (*Cassieae*) ..... 23. *Cassia*
      3. Anthers versatile, opening by longitudinal slits.
         4. Ovary or its stipe more or less adnate to the calyx-tube (*Amherstieae*).
            5. Petals wanting ..... 18. *Crudia*
            5. Petals present.
               6. Petals 3; stamens 3, monadelphous; pod fleshy..... 19. *Tamarindus*
               6. Petal one.
                  7. Calyx and pod armed with spines..... 17. *Sindora*
                  7. Calyx and pod unarmed.
                     8. Perfect stamens 3; seeds not arillate; pods flat..... 20. *Intsia*
                     8. Perfect stamens usually 7; seeds with a very prominent aril; pods woody, turgid ..... 21. *Pahudia*
         4. Ovary quite free from the calyx; ovules 1 or 2, rarely 3.
            5. Petals 5; leaflets few, sometimes solitary..... 15. *Cynometra*
            5. Petals wanting; leaflets few, large, glandular-punctate. 16. *Kingiodendron*

C. Papilionatae.

1. Stamens free; trees.
   2. Stigma oblique; pod short, turgid, few-seeded..... 30. *Ormosia*
   2. Stigma terminal; pod elongated, moniliform, several-seeded..... 31. *Sophora*

1. Stamens more or less united, mon- or diadelphous.
   2. Fruit a loment, that is, ultimately separating into indehiscent, 1-seeded joints, rarely reduced to a single joint (*Monarthrocarpus*), or not jointed (*Pseudarthria*), and very rarely dehiscent (*Pycnospora*, *Desmodium* § *Pleurolobium*).
      3. Leaves pinnate; leaflets 5 or more, not stipellate.
         4. Stamens united into two phalanges of five each.
            5. Erect shrubs; joints of the pod longitudinally ribbed, somewhat muricate ..... 42. *Ormocarpum*

5. Herbs; joints of the pods not ribbed.
6. Leaves odd-pinnate; pod exserted..... 43. *Aeschynomene*
6. Leaves even-pinnate; pod folded together within the calyx. 44. *Smithia*
4. Stamens united into a closed tube; leaves even-pinnate, the rachis ending in a bristle; cultivated herbs with hypogeal fruit..... 45. *Arachis*
3. Leaves digitately 2-foliolate; joints of the pod muricate..... 46. *Zornia*
3. Leaves pinnately 3-foliolate or reduced to a single leaflet; leaflets mostly stipellate; vexillary filament free or more or less united with the others.
4. Ovary with from 2 to many ovules.
5. Pod equaling or exceeding the calyx, exserted.
6. Articulations of the pod distinct.
7. Pod flattened ..... 47. *Desmodium*
7. Pod cylindric ..... 51. *Alysicarpus*
6. Pod obscurely or not articulated, but with transverse lines between the seeds, or with transverse reticulations.
7. Pod flat, indehiscent, thin, with transverse lines between the seeds ..... 49. *Pseudarthria*
7. Pod inflated, dehiscent, with transverse reticulations. 50. *Pycnospora*
5. Pod folded together within the calyx.
6. Calyx-teeth setaceous, not accrescent; leaflets longer than broad; flowers in very dense, spike-like or capitate racemes..... 52. *Uraria*
6. Calyx-teeth lanceolate, accrescent; leaflets as broad, or broader than long; flowers few, in lax racemes..... 53. *Loureo*
4. Ovary 1-ovuled; pods indehiscent, with a single seed.
5. Scandent; flowers and fruit completely hidden by a large, membranaceous, accrescent bract ..... 54. *Phylacium*
5. Erect or suberect, herbaceous or suffrutescent; flowers and fruits not inclosed by bracts.
6. Leaflets 1- or 3-foliolate, ample, stipellate..... 48. *Monarthrocarpus*
6. Leaflets 3-foliolate, small, exstipellate..... 55. *Lespedeza*
2. Fruit a dehiscent or indehiscent pod, not jointed.
3. Leaves simple or with three or more digitately arranged leaflets.
4. Leaves simple.
5. Trees ..... 61. *Inocarpus*
5. Herbs or undershrubs.
6. Stamens monadelphous; herbs with inflated, several- to many-seeded pods ..... 32. *Crotalaria*
6. Stamens diadelphous; seeds few.
7. Pods dehiscent.
8. Shrubby; leaves petioled, ample; flowers and fruits hidden by large, thin, persistent bracts..... 85. *Flemingia*
8. Herbs with sessile or subsessile leaves, the flowers not hidden by bracts.
9. Erect herbs from tuberous rootstocks; pod oblong, turgid. 84. *Eriosema*
9. Roots not tuberous; pods globose, 1-seeded, or linear and several-seeded ..... 34. *Indigofera*
7. Pod indehiscent, 1-seeded; leaves glandular, petioled; racemes dense ..... 35. *Psoralea*
4. Leaves with 3 or more digitately arranged leaflets.
5. Stamens monadelphous; pods inflated ..... 32. *Crotalaria*

5. Stamens diadelphous.
6. Leaflets narrow, small; pods linear ..... 34. *Indigofera*
6. Leaflets large, ovate; pods inflated..... 85. *Flemingia*

3. Leaflets pinnately 3-foliolate.
4. Leaflets not stipellate.
5. Pods indehiscent.
6. Herbs with small, toothed leaflets; pods small, falcate or spiral. 33. *Medicago*
6. Woody vines with ample, entire leaflets; pods flat, winged down one side ..... 59. *Derris*
5. Pods dehiscent.
6. Leaves not glandular-dotted beneath ..... 78. *Pueraria*
6. Leaves glandular-dotted beneath.
7. Ovules 4 or more.
8. Scandent, herbaceous; stigma small, terminal; seeds strophiolate or substrophiolate.
9. Pod acuminate, hardly depressed between the seeds; funicle expanded, but seeds not distinctly strophiolate. 81. *Dunbaria*
9. Pod obtuse or apiculate-acuminate, deeply transversely lineate between the seeds; strophiole large.... 82. *Cantharospermum*
8. Erect, shrubby; stigma dilated, oblique; seeds not strophiolate; pods acuminate, with depressed lines between the seeds. 80. *Cajanus*
7. Ovules 2; scandent ..... 83. *Rhynchosia*
4. Leaflets not stipellate, the stipels replaced by large glands; trees with large red flowers ..... 70. *Erythrina*
4. Leaflets stipellate.
5. Style bearded below the stigma.
6. Stigma oblique.
7. Keel spirally twisted ..... 86. *Phaseolus*
7. Keel not spiral.
8. Style filiform; flowers mostly yellow; leaflets entire.... 87. *Vigna*
8. Style flattened upwards; flowers blue; leaflets sinuate-toothed; root large, turnip-shaped ..... 89. *Pachyrrhizus*
6. Stigma terminal.
7. Pod flattened, not winged ..... 88. *Dolichos*
7. Pod square, 4-winged ..... 90. *Psophocarpus*
5. Style not bearded below the stigma.
6. Stamens monadelphous, the vexillary filament more or less united with the others.
7. Nodes of the raceme not swollen.
8. Anthers uniform, all fertile ..... 68. *Glycine*
8. Five stamens bearing fertile anthers, the alternating five sterile. 69. *Teramnus*
7. Nodes of the raceme swollen.
8. Upper lip of the calyx projecting, distinctly longer than the lower one ..... 79. *Canavalia*
8. Upper lip of the calyx not, or but slightly exceeding the lower one.
9. Pods large, turgid, few-seeded (unknown in *Luzonia*); flowers medium to large.
10. Fertile stamens 10 ..... 77. *Macropsychanthus*

10. Fertile stamens 6.
11. Calyx-teeth connate into two lobes, the upper one minutely 2-toothed, the lower minutely 3-toothed.... 76. *Luzonia*
11. Upper two calyx-teeth connate into an entire or minutely 2-toothed lobe, the lower three calyx-teeth distinct, about as long as the upper lobe..... 75. *Dioclea*
9. Pods small, narrow, elongated, many-seeded; flowers small to medium; fertile stamens 10 ..... 78. *Pueraria*

6. Stamens diadelphous, the vexillary one free from the others.
7. Pod indehiscent, membranaceous, oblong, with faint transverse lines between the seeds ..... 49. *Pseudarthria*
7. Pod indehiscent, coriaceous, reticulated; with no transverse lines, 1-seeded ..... 48. *Monarthrocarpus*
7. Pod dehiscent only at the seed-bearing apex, elsewhere seedless and indehiscent, thin; scandent woody vines..... 73. *Spatholobus*
7. Pod dehiscent from end to end.
8. Nodes of the racemes not swollen.
9. Petals very unequal; flowers large; pods prominently longitudinally ridged ..... 65. *Centrosema*
9. Petals subequal; flowers small; pods not longitudinally ridged.
10. Pods with transverse lines between the seeds, or with transverse reticulations; erect or ascending herbaceous or suffrutescent plants.
11. Pods thin, flat, dehiscent by the lower suture, with transverse lines between the seeds; flowers pink or purplish. 47. *Desmodium*
11. Pod short, inflated, with numerous transverse reticulations; flowers blue ..... 50. *Pycnospora*
10. Pods with no transverse lines or reticulations; herbaceous vines.
11. Style filiform; calyx-teeth distinct..... 67. *Shuteria*
11. Style flattened upwards; calyx truncate..... 66. *Dumasia*
8. Nodes of the racemes swollen.
9. Flowers large; petals very unequal; herbaceous or woody vines.
10. Keel exceeding the wings and standard; pods flat, variously grooved or smooth, often with stinging hairs. 72. *Mucuna*
10. Keel and standard equal, wings short; pods thick, glabrous, not grooved ..... 71. *Strongylodon*
9. Flowers small; petals subequal; herbaceous vines. 74. *Galactea*

3. Leaves pinnately 5- to many-foliolate.
4. Leaves even-pinnate.
5. Rachis terminating in a tendril..... 62. *Pisum*
5. Rachis not terminating in a tendril.
6. Vines with pink flowers and flat pods..... 63. *Abrus*
6. Erect, suffrutescent, coarse herbs with yellow flowers, or trees with very large white flowers; pods very long, subcylindric, septate between the seeds ..... 40. *Sesbania*

4. Leaves odd-pinnate.
5. Pods ultimately dehiscing by both sutures.

6. Herbaceous or suffrutescent, if erect shrubs then with subcylindric pods.
   7. Anthers apiculate, hairs centrally fixed; erect suffrutescent herbs, or shrubs; pods cylindric or 4-angled..... 34. *Indigofera*
   7. Anthers obtuse, hairs basifixed; pods flat..... 37. *Tephrosia*
6. Trees; pods flat.
   7. Racemes terminal or in the upper axils..... 38. *Millettia*
   7. Racemes from the branches below the leaves..... 39. *Gliricidia*
6. Scandent woody or somewhat herbaceous vines.
   7. Flowers large, axillary, solitary; pods flat; leaflets 5 to 7. 64. *Clitorea*
   7. Flowers small, in dense racemes; pods turgid; leaflets numerous. 41. *Clianthus*

5. Pods indehiscent.
   6. Erect herbs with small leaflets and dense, subcapitate inflorescence of small blue flowers..... 36. *Parosela*
   6. Erect shrubs or small trees with racemose flowers; pods ellipsoid or oblong-ovoid, 1-seeded, almost berry-like, not at all flattened. 60. *Euchresta*
   6. Erect trees or scandent woody shrubs; pods flattened.
      7. Leaflets distinctly alternate; pods winged.
         8. Large trees; flowers yellow, medium-sized; pods orbicular. 57. *Pterocarpus*
         8. Scandent shrubs or small trees; flowers small, pink or white; pods elongated, narrow ..... 56. *Dalbergia*
      7. Leaflets opposite.
         8. Pod thick, not winged; erect trees..... 58. *Pongamia*
         8. Pod thin, winged; scandent shrubs..... 59. *Derris*

1. SERIANTHES Benth.

1. **Serianthes grandiflora** (Wall.) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 225, Trans. Linn. Soc. **30** (1875) 599; Miq. Fl. Ind. Bat. 1[1] (1855) 40; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 301; F.-Vill. Nov. App. (1880) 75; Naves in Blanco Fl. Filip. ed. 3, *pl. 454;* Vidal Sinopsis Atlas (1883) *t. 44, f. E,* Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 121; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 251.

Inga grandiflora Wall. Cat. (1832) no. 5285.

NEGROS, *For. Bur. 5616 Everett.* PALAWAN, *For. Bur. 3800 Curran.* DINAGAT, *Ahern 447.* MINDORO (*Cuming 1592*).[7] NEGROS (*Vidal 288*).

Native names: *Jonoc* (Dinagat); *casqy* (Negros).

In beach forests, Malay Peninsula and Archipelago to New Guinea and the Aru Islands.

2. ENTEROLOBIUM Mart.

1. **Enterolobium saman** (Jacq.) Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 252.

Mimosa saman Jacq. Fragm. (1800–1809) 15, *t. 9.*

Inga saman Willd. Sp. Pl. **4** (1805) 1024.

Pithecolobium saman Benth. in Hook. Lond. Journ. Bot. **3** (1844) 216, Trans. Linn. Soc. **30** (1875) 587; F.-Vill. Nov. App. (1880) 76; Naves in Blanco Fl. Filip. ed. 3, *pl. 309.*

[7] Specimens cited in parentheses not seen.

Calliandra saman Griseb. Fl. Brit. West Ind. (1864) 225.

LUZON, Manila, *Merrill 11, Decades Philip. Forest Fl. 276, For. Bur. 10793 Curran, Sabino 403.* PALAWAN, *For. Bur. 4133 Curran, Bur. Sci. 878 Foxworthy.*

A native of tropical America, introduced into the Philippines about the year 1860, and now widely cultivated as a shade tree in towns throughout the Archipelago; subspontaneous in some localities. It is locally known as "*acacia*"; the rain tree of the West Indies.

3. PITHECOLOBIUM Mart.

Armed with spinescent stipules; seeds arillate; pinnæ and leaflets 1-jugate. 1. *P. dulce*

Unarmed; seeds without arillus.

Pods deeply lobed between the seeds, the lobes extending more than half way or quite to the upper suture and turned regularly and alternately right and left, dehiscent only opposite the seeds ..... 2. *P. scutiferum*

Pods only faintly or not at all sinuate on the lower suture between the seeds, the dehiscence continuous.

Pinnæ 1–2-jugate; leaflets few, medium to large, 2–3-jugate.

Pinnæ 1-jugate.

Leaflets 12 to 15 cm long; pods nearly straight, flattened, not at all twisted, 3.5 cm broad ..... 3. *P. platycarpum*

Leaflets less than 12 cm long; pods very strongly curved, sometimes twisted, less than 2 cm broad ..... 4. *P. pauciflorum*

Pinnæ 2-jugate.

Leaflets 10 cm long or less; pods less than 2 cm wide. 5. *P. mindanaense*

Leaflets up to 20 cm in length; pods about 3 cm wide.... 6. *P. ellipticum*

Pinnæ mostly 4- to 10-jugate; leaflets small, all more or less rhomboidal, numerous, 5- to 20-jugate.

Pinnæ 2–4-jugate; distal leaflets larger than the lower ones. 7. *P. angulatum*

Pinnæ 6–10-jugate; leaflets equal or subequal, the terminal pair not larger than the others.

Leaflets rhomboid, 5 to 10 mm wide ..... 8. *P. subacutum*

Leaflets rhomboid-linear or rhomboid-oblong, 2 to 3 mm wide. 9. *P. prainianum*

1. **Pithecolobium dulce** (Roxb.) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 199, Trans. Linn. Soc. **30** (1875) 572; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 302; F.-Vill. Nov. App. (1880) 75; Vid. Rev. Pl. Vasc. Filip. (1886) 121; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 61; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 263.

Mimosa dulcis Roxb. Pl. Corom. **1** (1795) 67, *t. 99.*

Inga dulcis Willd. Sp. Pl. **4** (1805) 1005.

Inga camatchili Perr. Mém. Soc. Linn. Paris **3** (1824) 122; C. B. Rob. in Philip. Journ. Sci. **3** (1908) Bot. 305.

Mimosa unguis-cati Blanco Fl. Filip. (1837) 731, non Linn.

Inga lanceolata Blanco l. c. ed. 2 (1845) 370, ed. 3, **2:** 322; Naves l. c. *pl. 237,* non H. & B.

LUZON, Province of Abra, *For. Bur. 14512 Darling:* Province of Ilocos Norte, *Bur. Sci. 2207 Mearns:* Province of Union, *Elmer 5613:* Province of Batangas, *Marave 71:* Province of Rizal, *Merrill 1640:* Province of Bataan, *Ahern 763,*

For. Bur. 1265, 1268 Borden, For. Bur. 63 Barnes, For. Bur. 2274 Meyer, Williams 380: Manila, *Merrill 654, For. Bur. 19009 Curran:* Province of Tayabas, *Ritchie s. n.* PALAWAN, *For. Bur. 3595 Curran.* PANAY, *Merrill 2410, For. Bur. 112 Gammill.* NEGROS, *For. Bur. 12319 Everett.* MINDANAO, District of Cotabato, *For. Bur. 3952 Hutchinson.*

A species of tropical America, introduced into the Philippines at an early date, and now spontaneous, very widely distributed and abundant in the Archipelago. From the Philippines it has been introduced into other parts of Malaya and into British India, being known in the latter country as the "Manila tamarind." It is known throughout the Philippines as *camonchiles* or *camonsiles*, or variations of the name, such as *camatsile, camanchiles, camonsil*, etc.

The fleshy aril surrounding the seeds is eaten, and the bark is extensively used in the Philippines for tanning leather.

2. **Pithecolobium scutiferum** (Blanco) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 211; Miq. Fl. Ind. Bat. 1[1] (1855) 39; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 228.

Mimosa scutifera Blanco Fl. Filip. (1837) 735, ed. 2 (1845) 507, ed. 3, **3:** 138.

Pithecolobium lobatum F.-Vill. Nov. App. (1880) 75; Naves in Blanco Fl. Filip. ed. 3, *pl. 438;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62, non Benth.

A widely distributed endemic species, represented by the numerous specimens cited previously by me, *l. c.*, extending from northern Luzon south to Ticao, Masbate, and Guimaras. Bentham originally considered it as a distinct species, but later,[8] and I believe erroneously, reduced it to the Malayan *P. lobatum* Benth., in which he has been followed by subsequent Philippine authors. The Philippine form is well distinguished from the Malayan one by its peculiar fruits, and is well represented by the plate in the third edition of Blanco's "Flora de Filipinas" cited above.

Native names: *Anagap* (in most islands and provinces where it occurs); *bunsilac* (Mindoro); *anagop* (Ticao); *anaguep* (Camarines); *bincalan* (Bataan); *bag* (Cagayan).

3. **Pithecolobium (?) platycarpum** sp. nov.

Arbor glabra circiter 5 m alta, ramis teretibus, lenticellatis; pinnis 1-jugatis, foliolis 2-jugatis, firmiter chartaceis, elliptico-oblongis, usque ad 15 cm longis, basi acutis, apice breviter acuminatis, nervis utrinque circiter 6, distinctis, anastomosantibus: leguminibus planis, subrectis, circiter 20 cm longis, 3.5 cm latis, basi longe stipitatis, utrinque dehiscentibus, leviter irregulariter sinuosis.

A glabrous tree about 5 m high. Branches terete, lenticellate, reddish-brown. Leaves alternate, pinnae 1-jugate, the petiole 2.5 to 3 cm long; leaflets 2-jugate, the rachis of the individual pinnae about 9 cm long, the leaflets firmly chartaceous, elliptic-oblong, 11 to 15 cm long, 5 to 6 cm wide, shining, gradually narrowed below to the acute base, the apex shortly and sometimes rather abruptly acuminate; nerves about 6 on each side of the midrib, distinct beneath, curved-ascending, anastomosing, the primary reticulations distinct, rather lax; petiolules 2 to 3 mm long. Flowers unknown. Pods pendent, flat, including the slender stipe about

[8] Trans. Linn. Soc. **30** (1875) 575.

20 cm long, 3.5 cm wide, smooth, shining, irregularly sinuate and dehiscent on both sutures, straight or nearly so, apex with a stout, somewhat incurved beak, the stipe slender, about 4 cm long. Seeds 6 or 7 in each pod, flattened, black, elliptic in outline, about 2 cm long.

LUZON, Province of Benguet, Twin Peaks, *Elmer 6439*, June 8, 1904.

A species in vegetative characters similar to *Pithecolobium scutiferum*, but distinguishable at once by its very different pods.

4. **Pithecolobium pauciflorum** Benth. in Lond. Journ. Bot. **3** (1844) 212; Miq. Fl. Ind. Bat. 1[1] (1855) 40; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 229.

LUZON, Province of Albay, *For. Bur. 10566 Curran*. LEYTE, *For. Bur. 11639 Whitford, For. Bur. 12893 Rosenbluth*. BOHOL, *Cuming 1854* (cotype). MINDANAO, Province of Surigao, *Bolster 286*.

Native names: *Malatagum* (Albay); *panauisaming* (Surigao).

An endemic species, erroneously reduced by Bentham[9] to *Pithecolobium lobatum* Benth., from which it is quite distinct in vegetative and fruit characters.

5. **Pithecolobium mindanaense** sp. nov. § *Clypearia*.

Arbor parva, subglabra; foliis bipinnatis, pinnis 2-jugatis, foliolis 2- vel 3-jugatis, elliptico-ovatis vel oblongo-ovatis, chartaceis vel submembranaceis, usque ad 12 cm longis, basi acutis, apice plerumque abrupte obtuse acuminatis, interdum caudato-acuminatis, nervis utrinque 3 vel 4, prominentibus, valde obliquis; floribus sessilibus, capitato-dispositis; leguminibus circinatis, 10 ad 12 cm longis, circiter 1.5 cm latis, in sicco extus nigris vel brunneis, intus rubris.

A small tree (4 m high *fide* Clemens), glabrous or nearly so, or the branchlets and inflorescence at first slightly pubescent. Branches terete, light-gray or brown, somewhat lenticellate. Leaves bipinnate, the petiole and rachis varying from 5 to 10 cm in length, with from two to four small sessile glands on the upper surface; pinnae 2-jugate; leaflets 2- or 3-jugate, those on the upper pair of pinnae usually 3-jugate, those on the lower pair 2-, rarely 1-jugate, elliptic-ovate to oblong-ovate, chartaceous or submembranaceous, slightly shining when dry, 7 to 12 cm long, 3 to 5 cm wide, the base acute, the apex usually rather abruptly acuminate, the acumen blunt, or sometimes the apex caudate-acuminate; nerves prominent, curved-ascending, 3 or 4 on each side of the midrib, the reticulations lax; petiolules about 2 mm long. Panicle-branches very slender, elongated, the flowers sessile, in heads of from three to five flowers each at the ends of the branchlets, the bracts and bracteoles small, about 1.5 mm long, obtuse, oblong. Calyx about 1.5 mm long, glabrous, with five broad teeth. Corolla 5 mm long, the lobes somewhat acuminate, veined. Stamens about 50, nearly 1.5 cm long. Pods 10 to 12 cm in length, about 1.5 cm wide, curved into an almost complete circle, glabrous, ultimately dehiscing by both sutures, before dehiscence not sinuate between the seeds, the base acute, the apex rounded, when

[9] Trans. Linn. Soc. **30** (1875) 575.

dry black or dark-brown outside, red within. Seeds 8 to 10 in each pod, elliptic, somewhat compressed, black when dry, about 12 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.* (type), May, 1907, also *no. 277*, February, 1906, and unnumbered specimens collected in June and September, 1907. BASILAN, *DeVore & Hoover 96*, and apparently also a sterile specimen collected on that island by *Hallier, s. n.*

The above species is recognizable by its bipinnate leaves, the pinnæ being 2-jugate, and the leaflets 2- or 3-jugate, by its strongly and obliquely nerved leaflets which are abruptly and usually prominently blunt-acuminate, its slender panicle-branches, capitate sessile flowers, and its pods, which are curved into an almost complete circle.

6. **Pithecolobium ellipticum** (Blume) Hassk. in Retzia **1** (1855) 225; Prain ex King in Journ. As. Soc. Beng. **66** ² (1897) 270, 516; Merr. & Rolfe in Philip. Journ. Sci. **3** (1908) Bot. 104.

Inga elliptica Blume Cat. Gew. Buitenzorg (1823) 88; Walp. Repert. **1** (1842) 930.

Pithecolobium fasciculatum Benth. in Hook. Lond. Journ. Bot. **3** (1844) 208; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 304.

PALAWAN, *For. Bur. 4144 Curran.* MINDANAO, District of Zamboanga, *Copeland s. n., Williams 2094.*

Malay Peninsula and Archipelago.

7. **Pithecolobium angulatum** (Grah.) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 208, Trans. Linn. Soc. **30** (1875) 580; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 306; F.-Vill. Nov. App. (1880) 76; Perk. Frag. Fl. Philip. (1904) 4; Prain ex King in Journ. As. Soc. Beng. **66** ² (1897) 274.

Inga angulata Grah. in Wall. Cat. (1832) no. 5271.

LUZON, Province of Tayabas, *Whitford 650, For. Bur. 10743 Curran.* POLILLO, *Bur. Sci. 6869 Robinson, Bur. Sci. 10765 McGregor.* MINDORO, *Merrill 1799, McGregor 138, For. Bur. 3692, 4100, 5321, 9881, 11498 Merritt.* PALAWAN, *For. Bur. 3477 Curran, Bur. Sci. 748 Foxworthy.* MASBATE, *For. Bur. 1716 Clark.* GUIMARAS, *For. Bur. 270 Gammill.* NEGROS, *For. Bur. 5574 Everett.*

Native names: *Saga, barocmoc, bahay* (Mindoro); *bunsicag* (Palawan); *bagatngo* (Negros).

This species is exceedingly variable, and extends from India to the Malay Peninsula, Sumatra, Java, and Borneo.

The typical form, with terminal leaflets 7 to 12 cm long, which Prain has designated as var. *heterophylla*, is not found in the Philippines, but rather the var. *intermedia* Prain, characterized by its more numerous pinnæ, and smaller, more numerous leaflets.

8. **Pithecolobium subacutum** Benth. in Hook. Lond. Journ. Bot. **3** (1844) 210, Trans. Linn. Soc. **30** (1875) 578; Miq. Fl. Ind. Bat 1 ¹ (1855) 37; F.-Vill. Nov. App. (1880) 76; Vid. Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 121.

Mimosa scutifera var. (*casai*) Blanco Fl. Filip. (1837) 736, ed. 2 (1845) 508, ed. 3, **3**: 138; Naves l. c. *pl. 447.*

Pithecolobium montanum Perk. Frag. Fl. Philip. (1904) 5; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 61, non Benth.?

BATANES ISLANDS, Sabtan, *Bur. Sci. 3740 Fénix.* LUZON, Province of Cagayan, *Bur. Sci. 7782 Ramos, For. Bur. 17069 Curran, For. Bur. 6656 Klemme, For. Bur. 14798 Darling:* Province of Isabela, *For. Bur. 18551 Alvarez:* Province of Benguet, *Elmer 6088, Bur. Sci. 2708 Mearns, Williams 1290:* Province of Ilocos Norte,

Bur. Sci. 7639 Ramos: Province of Zambales, *For. Bur. 6501 Aguilar, Hallier s. n., For. Bur. 6334 Curran, Merrill 2926:* Province of Nueva Vizcaya, *For. Bur. 18397 Alvarez:* Province of Bataan, *For. Bur. 2746 Borden, Williams 688:* Province of Pangasinan, *For. Bur. 9634 Zschokke:* Province of Bulacan, *For. Bur. 11137 Aguilar:* Province of Laguna, *Hallier s. n., For. Bur. 10042, 10068 Curran, For. Bur. 7702 Curran & Merritt:* Province of Rizal, *Bur. Sci. 106 Foxworthy, Merrill 1622, 5048, 2330, For. Bur. 2444 Ahern's collector:* Province of Sorsogon, *For. Bur. 10540 Curran.* CULION, *Merrill 579.* PALAWAN, *Bur. Sci. 688 Foxworthy.* SAMAR, *For. Bur. 12883 Rosenbluth.* LEYTE, *Elmer 7114.* NEGROS, *For. Bur. 17403 Curran.*

Native names: *Tugayong, narandauel, saplit* (Cagayan); *carisquis, ayamguitan* (Zambales); *tugurare* (Pangasinan); *inep* (Bulacan); *malasaga, malaganip, tekin* (Laguna); *bahay* (Sorsogon); *tagomtagom* (Samar); *tique* (Rizal); *casai, malacamonsili, alobahai,* ex Blanco.

Celebes (*fide* Koorders).

This species is exceedingly variable, but after a careful study of the material cited above, I feel confident that all the specimens are referable to one species. The variability seems to parallel that of the preceding form. As I have no authentic material of *Pithecolobium montanum* Benth. for comparison, I am unable to determine the points of difference between the two. It is barely possible that *P. subacutum* Benth., is only a form or variety of *P. montanum* Benth. The two species are placed by Bentham under separate series, *Sessiliflorae* and *Pedicellatae,* but in our Philippine material the flowers appear to be indifferently pedicelled, subsessile or sessile. The plate in the third edition of Blanco's "Flora de Filipinas," cited above, well represents the species.

9. **Pithecolobium prainianum** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61, l. c. 2 (1907) Bot. 276.

Pithecolobium parvifolium Merr. Govt. Lab. Publ. (Philip.) **29** (1905) 19, non Benth.

Pithecolobium montanum var. *microphylla* Benth. Trans. Linn. Soc. **30** (1875) 581; Vidal Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 121, non *P. microphyllum* Benth.

P. montanum Vid. Sinopsis Atlas (1883) *t. 45, f. A.* ?, non Benth.

LUZON, District of Lepanto, *For. Bur. 14488 Darling:* Province of Benguet, *Topping 128, For. Bur. 928 Barnes, For. Bur. 4919, 10893 Curran, Elmer 5863, Bur. Sci. 2713 Mearns, Williams 1322, For. Bur. 18303 Alvarez:* Province of Pampanga, *Merrill 3836:* Province of Bataan, *Whitford 1179, Merrill 3876, For. Bur. 2790 Meyer:* Province of Tayabas, *For. Bur. 7837 Curran & Merritt.* MINDORO, *Merrill 5702, For. Bur. 8508, 8719 Merritt.* LEYTE, *For. Bur. 12623 Rosenbluth.*

Borneo, Java.

This species is usually found at higher altitudes than any of the preceding ones, and is frequently found in exposed ridge-forests on mountains, ascending to at least 1600 m. It shows a tendency to intergrade with the preceding species, through such forms as *Fénix 3740,* and *Elmer 7114.* On the whole, however, it appears to be fairly constant, and readily distinguishable by its very small leaflets.

DOUBTFUL AND EXCLUDED SPECIES.

PITHECOLOBIUM BIGEMINUM Mart. This is credited to the Philippines by F.-Villar, Nov. App. (1880) 75, and by Stapf, Trans. Linn. Soc. Bot. II **4** (1894) 144. I have seen no Philippine specimens, and the typical form of Martius' species probably does not extend to the Archipelago.

PITHECOLOBIUM CLYPEARIA Benth. Credited to the Philippines by Usteri, Beitr. Ken. Phil. Veg. (1905) 117, but probably an erroneous identification for *P. angulatum* Benth., or *P. subacutum* Benth.

4. ALBIZZIA Durazz.

Leaflets small or medium-sized, mostly oblong, ovate-oblong or linear-oblong, never more than 5 cm in length.
Scandent shrub; the petioles subtended by a thick, curved, hook-like pulvinus. ..... 1. *A. scandens*
Erect trees or shrubs; pulvinus not enlarged.
Leaflets oblong or ovate-oblong, obtuse, 1.5 to 5 cm long, the costa central or subcentral.
Flowers sessile; the portion of the leaflet on the upper side of the costa broader than the lower ..... 2. *A. procera*
Flowers pedicelled; leaflets subequilateral or the lower half broader than the upper.
Leaflets subequilateral; umbels few-flowered; flowers, including the stamens, 1.5 cm long; stamens purplish ..... 3. *A. retusa*
Leaflets inequilateral, the portion on the lower side of the midrib manifestly broader than the upper; umbels many-flowered; flowers including the stamens, about 3 cm long, white ..... 4. *A. lebbeck*
Leaflets small, linear or linear-oblong, usually more or less falcate and less than 1.5 cm in length, the costa strongly excentric, near the upper margin; flowers sessile.
Pinnæ usually 4- to 6-jugate; costa distinct from the upper margin of the leaflets ..... 5. *A. lebbekoides*
Pinnæ usually 9- to 15-jugate; costa close to the upper margin of the leaflets; stipules large, inequilateral, ovate, cordate, caducous, 2 to 2.5 cm long ..... 6. *A. marginata*
Leaflets large, ovate, acute or acuminate, the upper ones 10 to 18 cm long.
Pinnæ 2-jugate; leaflets pubescent with short appressed hairs beneath; inflorescence terminal; pods flat, not at all inflated, thin, dehiscent, 20 cm long or less ..... 7. *A. saponaria*
Pinnæ 1-jugate; leaflets entirely glabrous; inflorescence axillary; pods indehiscent strongly inflated opposite the seeds, 25 to 40 cm long ..... 8. *A. acle*

1. **Albizzia scandens** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 265.

PALAWAN, Iwahig, *Bur. Sci. 829 Foxworthy*, May, 1906. In thickets near the seashore.

Endemic.

2. **Albizzia procera** (Roxb.) Benth. in Lond. Journ. Bot. 3 (1844) 89, Trans. Linn. Soc. 30 (1875) 564; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 299; Miq. Fl. Ind. Bat. 1^1 (1855) 21; Prain ex King in Journ. As. Soc. Beng. 66^2 (1897) 259, 513; F.-Vill. Nov. App. (1880) 75; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62.

Mimosa procera Roxb. Pl. Coromandel 2 (1798) 12, *pl. 121.*

Acacia procera Willd. Sp. Pl. 4 (1805) 1063.

Mimosa coriaria Blanco Fl. Filip. (1837) 734, ed. 2 (1845) 506, ed. 3, 3: 136.

Albizzia retusa Perk. Frag. Fl. Philip. (1904) 6, non Benth.

LUZON, Province of Abra, *For. Bur. 14513, 14552, 14634 Darling:* Province of Ilocos Norte, *For. Bur. 13848 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 13025 Paraiso, For. Bur. 5241 Klemme:* Province of Union, *For. Bur. 14140 Merritt & Darling, Elmer 5692:* Province of Benguet, *Williams 1286, For. Bur.*

4900, 10866 Curran, For. Bur. 14110 Merritt & Darling: Province of Pampanga, *For. Bur. 9621 Zschokke:* Province of Zambales, *Merrill 2909, 3006, For. Bur. 6022, 6505 Aguilar:* Province of Rizal, *For. Bur. 5193 Curran, Merrill 2703:* Province of Bataan, *Merrill 1516, Williams 373, 726, For. Bur. 20005 Topacio, Whitford 41, For. Bur. 158 Barnes, For. Bur. 5271 Curran, Elmer 6892, For. Bur. 1270, 1292, 1293, 1310, 1382, 1555, 1567, 1620, 1823 Borden.* MINDORO, *For. Bur. 8756, 8819, 9704 Merritt, For. Bur. 11322 Rosenbluth.*

Native names: *Adaan* (Abra, Ilocos Norte and Sur, Union, Benguet); *calay* (Abra); *daan* (Benguet); *caral* (Pangasinan); *alalangad* (Pampanga, Bataan); *aninapla* (Pampanga, Rizal); *carail* (Zambales); *acleng parang* or *acle parang* (Zambales, Bataan, Mindoro); *anapla* (Mindoro); *anitap, ayangao, dariangao,* ex Blanco.

An abundant species in the regions where it is found, occurring especially at low altitudes in thickets and in open grass lands, but in some provinces reaching an altitude of at least 1,000 m. Nepal to Central China, Andaman Islands, Malay Archipelago to New Guinea and northern Australia; not as yet found in the Malay Peninsula.

3. **Albizzia retusa** Benth. in Hook. Lond. Journ. Bot. **3** (1844) 90, Trans. Linn. Soc. **30** (1875) 563; Miq. Fl. Ind. Bat. 1[1] (1855) 23; Vid. Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 120; F.-Vill. Nov. App. (1880) 75.

Mimosa lebbek Blanco Fl. Filip. (1837) 733, ed. 2 (1845) 506, ed. 3, **3**: 135, non Linn.

Albizzia littoralis Teysm. & Binn. Nat. Tijdschr. Ned. Ind. **29** (1867) 259; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 257, 512; Koord. & Valet. Meded. 's Lands Plant. **11** (1894) 301; Benth. Trans. Linn. Soc. **30** (1875) 648; Merr. in Forest. Bureau (Philip.) Bull. **1** (1903) 23.

Albizzia procera "Teysm. & Binn.;" Perk. Frag. Fl. Philip. (1904) 5, non Benth.

LUZON, Province of Cagayan, *For. Bur. 11309 Klemme, For. Bur. 13114 Bernardo, For. Bur. 16969 Curran, Bur. Sci. 7433 Ramos:* Province of Ilocos Norte, *Cuming 1223* (type number): Province of Tayabas, *For. Bur. 10181, 10302 Curran, Merrill 1024:* Province of Camarines, *For. Bur. 10689 Curran, Ahern 69.* MINDORO, *Cuming 1593, For. Bur. 3685, 9878 Merritt, Whitford 1433, Merrill 1213.* PALAWAN, *For. Bur. 3837 Curran, For. Bur. 11250 Manalo.* BALABAC, *Bur. Sci. 508 Mangubat.* LEYTE, *For. Bur. 12637 Rosenbluth.* MINDANAO, District of Davao, *Williams 2696, Copeland 557.*

Native names: *Tagolo, malenab* (Cagayan); *saplit* (Principe); *casay* (Camarines, Mindoro, Palawan); *sintog* (Davao); *langil* ex Blanco.

This species is apparently confined to the beach forests, at least in the Philippines, and is rather widely distributed, extending from the Nicobar Islands and Penang to Java, Amboina, Celebes, and the Caroline Islands (Yap, *Volkens 525,* distributed as *Albizzia retusa* Benth.). The type of *Albizzia retusa* was from the Philippines, *Cuming 1223,* supplemented by *Cuming 1593;* the former has leaflets somewhat smaller than those of typical *A. littoralis,* but the latter has them intermediate in size, while among the numerous specimens cited above all intergradations can be found. The retuse apices of the leaflets is by no means a constant character. The original description of *Albizzia littoralis* calls for flowers sessile or minutely pedicelled, but Koorders and Valeton, who had before them authentic material collected by Teysmann in Amboina, state that the pedicels are 3 to 4 mm long, which agrees with our Philippine material. The gland characters given by Prain to distinguish this species from *Albizzia procera* will not hold, as glands are found on both the primary and secondary

rachises in both species. It can at once be distinguished from *A. procera* by its pedicelled flowers, and entirely different pods. It is manifestly closely allied to *Albizzia lebbeck*, although very distinct from that species. The pods of the two are very similar.

4. **Albizzia lebbeck** (Linn.) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 87, Trans. Linn. Soc. **30** (1875) 562 (*lebbek*); Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 298; F.-Vill. Nov. App. (1880) 75; Naves in Blanco Fl. Filip. ed. 3, *pl. 316;* Vidal Rev. Pl. Vasc. Filip. (1886) 120, Sinopsis Atlas (1883) *t. 45, fig. E;* Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 257.

Mimosa lebbeck Linn. Sp. Pl. (1753) 516.

Acacia lebbeck Willd. Sp. Pl. **4** (1805) 1066.

Luzon, Province of Ilocos Sur, *Bur. Sci. 10098 McGregor:* Manila, *Ahern 721, 741, Merrill 2777, For. Bur. 19015, 19061 Curran* (all from cultivated trees: Province of Bataan, *For. Bur. 15559 Curran* (from cultivated tree). Palawan, *For. Bur. 15044 Danao.*

This species is almost certainly not a native of the Philippines; all the specimens seen from Luzon are from cultivated trees, but Danao states that the specimen from Palawan came from the forest. It appears to be wild in the drier parts of Africa and Asia, and is now widely cultivated in many parts of the world, China, Japan, West Indies, South America, etc. Most authors have followed DeCandolle and Bentham and spelled the specific name "*lebbek*," the original is, however, "*lebbeck*."

5. **Albizzia lebbekoides** (DC.) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 89, Trans. Linn. Soc. **30** (1870) 568; Koord. & Valet. Meded. 's Lands Plantent. **11** (1894) 306; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 62; Prain in Journ. As. Soc. Beng. **66** [2] (1897) 513.

Acacia lebbekoides DC. Prodr. **2** (1825) 467; Decne. ,Ann. Mus. Paris **3** (1834) 461.

Mimosa carisquis Blanco Fl. Filip. (1837) 734, ed. 2 (1845) 507; ed. 3, **3**: 137.

Albizzia julibrissin F.-Vill. Nov. App. (1880) 75, non Durazz.

Luzon, Province of Abra, *For. Bur. 14521 Darling:* Province of Ilocos Norte, *For. Bur. 13806 Merritt & Darling:* Province of Nueva Ecija, *For. Bur. 14324 Saroca:* Province of Pangasinan, *For. Bur. 8345 Curran & Merritt:* Province of Rizal, *For. Bur. 1126, 1857, 3305 Ahern's collector:* Province of Bataan, *Whitford s. n., For. Bur. 6347 Curran.* Mindoro, *For. Bur. 9815 Merritt.*

Native names: *Malaghanip* (Rizal); *carisquis* (Abra, Ilocos Norte, Nueva Ecija).

Usually found at low altitudes, and often back of mangrove swamps, ascending to 600 m in Abra.

Burma and Siam to Java and Timor.

6. **Albizzia marginata** (Lam.) comb. nov.

Mimosa marginata Lam. Encycl. **1** (1783) 12.

Mimosa stipulata Roxb. Hort. Beng. (1814) 40, nomen, Fl. Ind. **2** (1832) 549 (*stipulacea*).

Acacia marginata Ham. in Wall. Cat. (1832) no. 5243, nomen.

Albizzia stipulata Boiv. Encycl. XIX Siècle **2**: 33; Benth. in Hook. Lond. Journ. Bot. **3** (1844) 92, Trans. Linn. Soc. **30** (1875) 568; F.-Vill. Nov. App. (1880) 75; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 300; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 255, 515; Koord. & Valet. Meded. 's Lands Plantent. **11** (1894) 303.

Albizzia julibrissin Vid. Cat. Pl. Prov. Manila (1880) 28; Perk. Frag. Fl. Philip. (1904) 5, non Durazz.

LUZON, Province of Abra, *For. Bur. 14523 Darling:* Province of Nueva Vizcaya, *For. Bur. 18021 Merritt, For. Bur. 10861 Curran:* Manila, *Ahern 743:* Province of Rizal, *Merrill 1865, Decades Philip. Forest Fl. 215 Ahern's collector:* Province of Tayabas, *For. Bur. 6040 Kobbe:* Province of Bataan, *For. Bur. 17319 Curran, For. Bur. 13377 Cortes.*

Native names: *Malagahanip* (Tayabas); *malatiqui* (Rizal); *malasampaloc* (Bataan).

Tropical Asia to the Andaman Islands, Southern China, Java, and probably other islands of the Malay Archipelago.

I can see no valid reason why Lamarck's specific name should not be adopted, as it is much the earliest one for the species. Bentham[10] states that it is evident from the description and citation that Lamarck's species is referable to *Albizzia stipulata* Boiv., and not to *A. odoratissima* Benth. Lamarck's specimens were from Pondichéry, and he also refers to Rheede, Hort. Malabar. **6**: 9, *tab. 5*, as representing the species. The reference to *Albizzia marginata* Ham. Wall. Cat. no. 5243, in "Index Kewensis," does not constitute a valid transfer. Most of the specimens cited above have been distributed as *Albizzia julibrissin* Durazz., but some of the material recently collected shows the very large stipules characteristic of *Albizzia marginata,* hence the specimens are here referred to the latter.

7. **Albizzia saponaria** (Lour.) Blume ex Miq. Fl. Ind. Bat. 1[1] (1855) 19; Benth. in Trans. Linn. Soc. **30** (1875) 561; Vidal Rev. Pl. Vasc. Filip. (1886) 120; Perk. Frag. Fl. Philip. (1904) 6.

Mimosa saponaria Lour. Fl. Cochinch. (1790) 653.

Inga saponaria Willd. Sp. Pl. **4** (1805) 1008.

Albizzia lucida Merr. in Forestry Bureau (Philip.) Bull. **1** (1903) 23, non Benth.

Albizzia tomentella Merr. l. c., non Miq.?

LUZON, Province of Ilocos Norte, *For. Bur. 13883 Merritt & Darling, For. Bur. 14696 Darling:* Province of Ilocos Sur, *For. Bur. 5266 Klemme:* Province of Benguet, *For. Bur. 5132 Curran:* Province of Pangasinan, *For. Bur. 8269 Curran & Merritt:* Province of Pampanga, *For. Bur. 9612 Zschokke, For. Bur. 5779 Curran, Merrill 1390:* Province of Bataan, *For. Bur. 1563, 1932 Borden, For. Bur. 1498 Ahern's collector, For. Bur. 5298, 5468 Curran, Merrill 1515, For. Bur. 849 Maule, For. Bur. 20001 Topacio:* Province of Rizal, *Decades Philip. Forest Flora no. 84 Ahern's collector, Bur. Sci. 132 Foxworthy, For. Bur. 3339 Ahern's collector, For. Bur. 5195 Curran, Bur. Sci. 1509 Ramos:* Province of Laguna, *For. Bur. 10049 Curran:* Province of Tayabas, *For. Bur. 12268 Rosenbluth, Merrill 2602, For. Bur. 10285 Curran:* Province of Camarines, *For. Bur. 10424 Curran:* Province of Albay, *Bur. Sci. 2878, 2879 Mearns.* MINDORO, *McGregor 260, Merrill 2213, 2368, 2451, 2469, For. Bur. 11419 Merritt.* TICAO, *For. Bur. 1012 Clark.* MASBATE, *Merrill 3377, For. Bur. 1009 Clark, Whitford 1681.* GUIMARAS, *For. Bur. 305 Gammill.* SAMAR, *For. Bur. 12884 Rosenbluth.* LEYTE, *Elmer 7340.* NEGROS, *For. Bur. 17423 Curran.* MINDANAO, District of Zamboanga, *Williams 2095, For. Bur. 9003 Whitford & Hutchinson, Ahern 395, For. Bur. 9520 Hutchinson:* Province of Surigao, *Ahern 678, For. Bur. 7575 Hutchinson.* BASILAN, *Hallier s. n.*

Native names: *maratica* (Ilocos Norte and Sur); *gogon-toco* (Pangasinan, Pampanga, Rizal, Bataan); *malatuco* (Pampanga, Rizal, Laguna); *gogo-casay* (Tayabas); *salunguigui* (Mindoro, Ticao, Masbate); *salukugui* (Samar); *pipi* (Negros); *saluncugui, salancugui, siangcugi* (Mindanao).

The range of this species is somewhat doubtful, but it is probably rather widely

[10] Trans. Linn. Soc. **30** (1875) 569.

distributed in the Malay Archipelago. It was based on the description and very crude figure of *Cortex saponarius* given by Rumphius in "Herbarium Amboinense" 4 (1743) 131, *pl. 66*. I believe that there is very little doubt but that the material cited above represents the species, and consider it very doubtful if *Albizzia tomentella* Miq. will prove to be distinct. The bark contains a considerable amount of saponin, and is used throughout the Philippines as a substitute for soap. The species is variable in vegetative characters, large and small leaflets being frequently found on the same specimen.

8. **Albizzia acle** (Blanco) comb. nov.

Mimosa acle Blanco Fl. Filip. (1837) 738, ed. 2 (1845) 509, ed. 3, **3**: 140.

Xylia dolabriformis Vid. Cat. Pl. Prov. Manila (1880) 28; F.-Vill. Nov. App. (1880) 73, non Benth.

Pithecolobium acle Vid. Rev. Pl. Vasc. Filip. (1886) 121; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61, Forestry Bureau (Philip.) Bull. 1 (1903) 23; Perk. Frag. Fl. Philip. (1904) 4.

A tree, reaching a height of 25 or 30 m, glabrous or nearly so except the inflorescence. Branches terete, gray or brown, usually strongly lenticellate. Leaves bipinnate, the petiole 2 to 5 cm long, with a single large gland at the apex; pinnæ a single pair only, their rachises with a gland between each pair of petiolules; leaflets 2- to 4-jugate, the uppermost ones of each pinna the largest, when young very thinly membranaceous, becoming chartaceous, or ultimately even subcoriaceous, ovate to elliptic-ovate or oblong-ovate, often somewhat inequilateral, the largest ones up to 18 cm long and sometimes 8 cm wide, the lower ones smaller, shining when dry, the base acute or rounded, the apex distinctly blunt- or sharp-acuminate; nerves about 6 on each side of the midrib, distinct, anastomosing, the reticulations rather lax; petiolules 1.5 to 3 mm long. Inflorescences usually appearing with the leaves, axillary, softly pubescent, of many, fasciculate, rather densely disposed short panicles, the ultimate branches or peduncles to the heads of flowers 4 cm long or less. Flowers greenish-white, sessile, 10 to 15 in each head. Calyx somewhat tubular, pubescent, about 3 mm long, with 5 short teeth. Corolla pubescent, narrowly funnel-shaped, about 7 mm long. Stamens many, much exserted. Pods 20 to 40 cm long, varying from 3.5 to 5 cm in width, straight, indehiscent, thickly coriaceous, the base usually acute, the apex acuminate or rounded, sometimes slightly retuse and apiculate, constricted between the seeds, but without dissepiments, opposite the seeds much inflated, ultimately breaking irregularly across the pods at the constrictions between the seeds, and also breaking from the continuous and somewhat thickened margins. Seeds 10 to 12 in each pod, elliptic, about 2 cm long, 1.5 cm wide, and 7 or 8 mm thick, dark-reddish-brown, not arillate, marked on both sides with a horseshoe-shaped scar or line.

LUZON, Province of Ilocos Sur, *For. Bur. 13001 Paraiso:* Province of Nueva Ecija, *For. Bur. 11053 Saroca, For. Bur. 9602 Zschokke:* Province of Pangasinan, *For. Bur. 14355 Villamil:* Province of Zambales, *Merrill 2974, Hallier s. n., For. Bur. 8123 Curran & Merritt, For. Bur. 11041 Zschokke, For. Bur. 5816, 5835*

Curran: Province of Rizal, *Merrill 1306, 1635, 5035, Decades Philip. Forest Flora no. 53 Ahern's collector:* Province of Bataan, *Whitford 35, 1367, Williams 371, Elmer 6688, For. Bur. 5291, 6291, 6375 Curran, Bur. Sci. 1566 Foxworthy, For. Bur. 687, 689, 720 Borden, For. Bur. 366, 507 Barnes:* Province of Tayabas, *Merrill 2047, 2595, For. Bur. 1251 Rosenbluth, For. Bur. 14944 Darling, For. Bur. 6066 Kobbe, For. Bur. 11517 Whitford, Hagger s. n., For. Bur. 10261 Curran:* Province of Camarines, *Ahern 142:* Province of Sorsogon, *For. Bur. 10622 Curran.* MINDORO, *For. Bur. 9723bis Merritt.* PALAWAN, *For. Bur. 7429, 11249 Manalo, Curran s. n.* MASBATE, *For. Bur. 995 Clark, For. Bur. 12579, 12602 Rosenbluth.* NEGROS, *For. Bur. 11238 Everett, For. Bur. 18230 Rosenbluth.*

Native names: *Acle* (in most islands and provinces where it is found, and its commercial name); *quitaquita* (Ilocos Sur, Pangasinan, Zambales); *tili, teles* (Zambales); *langin* (Masbate); *sauriri* (Palawan); *banuyo* (Negros).

After a careful study of the above material, I am convinced that the species must be referred to *Albizzia*, rather than to *Pithecolobium*, where it was placed by Vidal. It differs from *Pithecolobium*, at least from the majority of the species now referred to that genus, in its straight and indehiscent pods, the first character being true of all species of *Albizzia* known to me, while a number of species have indehiscent pods. The seeds of *Albizzia acle* have on both sides rather distinct horseshoe-shaped markings, corresponding to the circular, oblong, oval, or elliptic markings on the seeds of *Albizzia* spp., and *Enterolobium saman*, while none of the species of *Pithecolobium* in this herbarium show corresponding scars or lines. The bark of *Albizzia acle* contains a considerable amount of saponin, like that *Albizzia saponaria* Blume, and like that of the latter species, is used by the natives as a substitute for soap; I know of no species of *Pithecolobium* having this property. The wood of this species has been described by Foxworthy;[11] it is dark-colored, moderately hard and heavy, and in structure and properties much more like that of various species of *Albizzia* than of *Pithecolobium*. Among the Philippine species it is most closely allied to *Albizzia saponaria* Bl.

Albizzia acle is a valuable timber tree in the Philippines, and is widely distributed at low altitudes. It is commercially known as *acle*, and the timber is used for many purposes.

Endemic.

EXCLUDED SPECIES.

ALBIZZIA LUCIDA (Roxb.) Benth.; F.-Vill. Nov. App. (1880) 75.

An Asiatic species, doubtfully extending to Singapore and Java, and not definitely known from the Philippines. Probably an erroneous identification on the part of F.-Villar for some form of *A. saponaria* Bl.

ALBIZZIA ODORATISSIMA (L. f.) Benth.; F.-Vill. l. c.

Like the preceding, a species not definitely known from the Philippines. Probably an erroneous identification for *A. lebbekoides* Benth.

5. WALLACEODENDRON Koorders.

1. **Wallaceodendron celebicum** Koord. Meded. 's Lands Plantent. **19** (1898) 446, 631; Gilg in Engl. & Prantl Nat. Pflanzenfam. Nachtr. **2** (1900) 30; Merr. Forest. Bureau (Philip.) Bull. **1** (1903) 23, Philip. Journ. Sci. **3** (1908) Bot. 409; Perk. Frag. Fl. Philip. (1904) 5.

Pithecolobium williamsii Elm. Leafl. Philip. Bot. **1** (1907) 223.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4098 Fénix:* Province of Cagayan,

[11] *This Journal* **2** (1907) Botany 269.

For. Bur. 11302 Klemme, For. Bur. 17129, 17274 Curran, For. Bur. 18430, 18527 Alvarez, For. Bur. 13116 Bernardo: Province of Isabela, *For. Bur. 18574 Alvarez:* Province of Benguet, *Elmer 8833* (type number of *Pithecolobium williamsii* Elm.): Province of Tayabas, *Merrill 2026, For. Bur. 10343, 10380 Curran:* Province of Camarines, *Ahern 49bis, For. Bur. 10468, 10655, Curran.* TICAO, *For. Bur. 15791 Rosenbluth, For. Bur. 2533 Clark.* BURIAS, *For. Bur. 1730 Clark.* MASBATE, *For. Bur. 12605, 12825 Rosenbluth.* SAMAR, *For. Bur. 12844 Rosenbluth.* NEGROS, *For. Bur. 8506 Everett.*

Native names: *Banuyo* (Tayabas, Samar, Masbate, Burias, Ticao, Camarines); *lupigui* (Cagayan, Isabela); *melmel, dauer* (Cagayan).

A monotypic genus at present known only from Celebes and the Philippines, growing especially near the seashore, but also occurring inland and at considerable altitudes. It undoubtedly belongs in the *Mimosoideae-Ingeae,* although in fruit characters it is closer to some of the genera in *Mimosoideae-Piptadenieae.* It is well characterized by its dehiscent pods, the exocarp of which is not transversely jointed, and which is free from the transversely septate endocarp, the latter forming a somewhat loose, parchment-like, more or less inflated envelope surrounding each seed, quite similar to that of *Entada,* and doubtless an adaptation for dispersal of the seeds by water. The timber is of considerable value, and has been considered by Foxworthy,[12] under the head of *Banuyo.*

6. ACACIA Willd.

Leaves reduced to simple, flat, narrowly lanceolate, somewhat falcate phyllodia, 6 to 11 cm long; heads axillary, solitary, peduncled..... 1. *A. confusa*
Leaves all bipinnate.
Erect shrubs or small trees with stipular spines; heads solitary or fascicled, axillary; pods cylindric ..... 2. *A. farnesiana*
Scandent shrubs with non-spinescent stipules and with prickly branches; heads mostly panicled, sometimes axillary; pods flat.
Heads fascicled or subpaniculately racemose at the nodes; pods thickened, more or less depressed and septate between the seeds..... 3. *A. rugata*
Heads usually in terminal panicles; pods thin, not septate between the seeds.
Leaflets oblong, 2 to 3 mm wide, not closely crowded, the costa submedian, at least well removed from the upper margin..... 4. *A. caesia*
Leaflets linear to linear-oblong, 1 to 1.3 mm wide, crowded, the costa close to the upper margin, at least near the base of the leaflets.
5. *A. pennata*

1. Acacia confusa sp. nov.

Acacia richii Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 215; Perk. Frag. Fl. Philip. (1904) 6; Mats. & Hayata Enum. Pl. Formosa (1906) 117; non A. Gray.

Arbor glabra 6 ad 15 m alta, differt a *A. richii* A. Gray phyllodinis angustioribus longioribusque, distincte plus falcatis, nervis paucioribus, leguminibus angustioribus, capitulis solitariis, non fasciculatis.

A glabrous tree 6 to 15 m high. Branches terete, gray or brown, lenticellate, the branchlets rather slender. Phyllodes narrowly lanceolate, subcoriaceous, rather distinctly falcate, 6 to 11 cm long, 5 to 8 mm wide, gradually narrowed at both ends, the apex rather blunt, sometimes subacute; nerves about 5, distinct. Heads axillary, solitary, about 5

[12] *This Journal* **2** (1907) Botany 376.

mm in diameter, the peduncles slender, about 1 cm long. Flowers yellow, with a faint odor, the calyx 2 mm long. Pods 4 to 9 cm long, 7 to 10 mm wide, dark-colored when dry, shining, base acute or acuminate, the apex acute or somewhat curved-apiculate, somewhat inflated opposite the seeds and frequently constricted between them, scarcely reticulated. Seeds 4 to 8 in each pod, elliptic, compressed, 5 mm long, their longer diameter arranged parallel with the pod, not at right angles to it.

LUZON, Province of Zambales, *Merrill 2114* (type), *For. Bur. 5922, 7010 Curran.* FORMOSA, *Henry 774.*

Acacia richii is said to be represented also by the following Formosan specimens, which I have not seen: *Oldham 193, Swinhoe s. n., Ford s. n., fide* Forbes & Hemsley; *Faurie 41, 141, fide* Matsumura and Hayata.

After a careful examination of the Philippine material, and a specimen of *Henry 774* from Formosa, and comparison of this material with the original description and figure, as well as with a typical phylloclade from the type collection of *Acacia richii* A. Gray, I am convinced that the form above described as *Acacia confusa* is specifically distinct from Gray's species. About four years ago Dr. C. B. Robinson, then at the New York Botanical Garden, called my attention to the differences between the Philippine material and the type collection of *A. richii*, and kindly supplied me with a fragment of the latter, expressing the opinion that two species were represented, an opinion in which I entirely concur.

Native names: *Ayañgili, ualisin* (Zambales).

Luzon and Formosa.

2. **Acacia farnesiana** (Linn.) Willd. Sp. Pl. 4 (1805) 1083; Benth. in Trans. Linn. Soc. **30** (1875) 502; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 292; Vid. Sinopsis Atlas (1883) *t. 45, fig. C,* Rev. Pl. Vasc. Filip. (1886) 119; F.-Vill. Nov. App. (1880) 74.

Mimosa farnesiana Linn. Sp. Pl. (1753) 521; Blanco Fl. Filip. (1837) 729, ed. 2 (1845) 504, ed. 3, **3**: 133.

LUZON, Province of Cagayan, *For. Bur. 17041 Curran:* Province of Abra, *For. Bur. 16561 Darling:* Province of Ilocos Sur, *For. Bur. 14083 Merritt & Darling:* Province of Union, *Elmer 5598:* Manila, *Merrill 3461:* Province of Laguna, *Elmer:* Province of Rizal, *Licup 382, Merrill 1641:* Province of Bataan, *Elmer 7003, Williams 361:* Province of Tayabas, *Bur. Sci. 2359 Mearns.* MINDORO, *For. Bur. 8564 Merritt.* MASBATE, *Merrill 3404.* GUIMARAS, *For. Bur. 47 Ritchie.* MINDANAO, *For. Bur. 3915 Hutchinson, Copeland s. n.*

Quite universally known in the Philippines by the name *aroma*, of Spanish origin; in Ilocos Sur, *candaroma.*

Probably a native of tropical America, now widely distributed in the tropics of the world; common and widely distributed at low altitudes in the Philippines and entirely naturalized.

3. **Acacia rugata** (Lam.) Ham. in Wall. Cat. (1832) no. 5251.

Mimosa rugata Lam. Encycl. **1** (1783) 20.

Mimosa concinna Willd. Sp. Pl. **4** (1805) 1039.

Acacia concinna DC. Prodr. **2** (1825) 464; Benth. in Trans. Linn. Soc. **30** (1875) 531; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 296; Vid. Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. (1886) 120.

Acacia philippinarum Benth. in Hook. Lond. Journ. Bot. **1** (1842) 514, quoad no. 1166 Cuming.

LUZON, Province of Union, *Elmer 5689.*

Acacia philippinarum Benth. was based on two specimens, one of which is referable to *A. rugata* (*A. concinna*), to which Bentham himself reduced the species, and the other is *Acacia caesia* Willd.

Apparently not common in the Philippines; India to southern China and the Malay Archipelago.

4. **Acacia caesia** (Linn.) Willd. Sp. Pl. 4 (1805) 1090; Benth. in Trans. Linn. Soc. 30 (1875) 530; Perk. Frag. Fl. Philip. (1904) 6; Trimen Fl. Ceylon 2 (1894) 127.

Mimosa caesia Linn. Sp. Pl. (1753) 522.

Mimosa intsia Linn. l. c.

Acacia intsia Willd. l. c. 1091; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 297; F.-Vill. Nov. App. (1880) 74; Vid. Sinopsis Atlas (1883) *t. 45, fig. D,* Rev. Pl. Vasc. Filip. (1886) 120; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62.

Acacia concinna Naves in Blanco Fl. Filip. ed. 3, *pl. 374,* non DC.

LUZON, Province of Ilocos Sur, *For. Bur. 5267 Klemme:* Province of Bataan, *Williams 478, Merrill 3796:* Province of Rizal, *Bur. Sci. 1431, 4578 Ramos, Merrill 2812, For. Bur. 3255 Ahern's collector.*

Native names: *Salsalomague* (Ilocos Sur); *daug, camat-cabay* (Bataan); *daug-manoc, sibog-aso* (Rizal).

Widely distributed in India and Ceylon, extending to Java and Sumatra, but not reported from the Malay Peninsula or from southern China. The specific name *caesia* has only page priority over *intsia* and has been here adopted following Bentham and Trimen. Trimen, *l. c.,* states that *Acacia intsia* can not be distinguished from *A. caesia,* even as a variety.

5. **Acacia pennata** (Linn.) Willd. Sp. Pl. 4 (1805) 1090; Benth. in Trans. Linn. Soc. 30 (1875) 530; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 297; Trimen Fl. Ceylon 2 (1894) 127; F.-Vill. Nov. App. (1880) 75; Vidal Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 120; Prain Journ. As. Soc. Beng. 66 [2] (1897) 250, 510.

Mimosa pennata Linn. Sp. Pl. (1753) 522.

Mimosa tenuifolia Blanco Fl. Filip. (1837) 739, ed. 2 (1845) 510, ed. 3, 3: 141, non Linn.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4038 Fénix.* LUZON, Province of Rizal, *For. Bur. 2891 Ahern's collector, Merrill 1660.*

Native name: *Sibog* (Rizal).

Var. **arrophula** (Don) Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 298; Prain l. c.

PALAWAN, *Bur. Sci. 897 Foxworthy.*

Var. **pluricapitata** (Steud.) Baker l. c.; Prain l. c.

LUZON, Province of Tayabas, *Elmer 9340.*

Tropical Asia and Africa to southern China, the Malay Peninsula and Archipelago.

Acacia pennata (L.) Willd, as interpreted by recent botanists, contains several rather distinct forms, three of which are found in the Philippines. I am not at all sure that the specimens above referred to the species represent the typical form. As here interpreted, it is characterized by its small and raised basal petiolar gland, with few small glands on the rachis, and its axillary, fascicled or solitary heads, which are sometimes arranged in short racemes. The var. *arrophula* is characterized by a large basal petiolar gland, with few small ones on the upper part of the rachis, while the var. *pluricapitata* is distinguished by its heads being arranged in ample terminal panicles, small, raised basal petiolar gland, and numerous small glands on the rachis, one between every pair of pinnæ,

except the lower three or four. Prain[13] has expressed the opinion that both the varieties *arrophula* and *pluricapitata* are worthy of specific rank, but that the point can only be determined satisfactorily by a monographic revision of the Indian species. I have here followed Baker and Prain, as there is not sufficient Indian material in our herbarium to determine the limits of the various forms.

ACACIA HOLOSERICEA A. Cunn. ex G. Don Gen. Syst. **2** (1832) 407; Benth. Fl. Austr. **2** (1864) .411.

This Australian species has been recently introduced, and is cultivated at Lamao, Province of Bataan, Luzon, where it has been collected by Mr. Cuzner, by Mr. Curran, *For. Bur. 12404*, and by Dr. Shaw.

7. LEUCAENA Benth.

1. **Leucaena glauca** (Linn.) Benth. in Hook. Journ. Bot. **4** (1842) 416, Trans. Linn. Soc. **30** (1875) 443; Baker in Hook f. Fl. Brit. Ind. **2** (1878) 290; F.-Vill. Nov. App. (1880) 74; Vid. Sinopsis Atlas (1883) *t. 45, fig. B;* Naves in Blanco Fl. Filip. ed. 3, *pl. 400.*

Mimosa glauca Linn. Sp. Pl. (1753) 520.

Acacia glauca Willd. Sp. Pl. **4** (1805) 1075.

LUZON, Province of Union, *Elmer 5565, 5654:* Province of Ilocos Sur, *For. Bur. 14021, 14022 Merritt & Darling:* Province of Nueva Ecija, *For. Bur. 11055 Saroca:* Province of Cavite, *Bur. Sci. 1287 Mangubat:* Province of Bataan, *For. Bur. 7515 Curran:* Province of Laguna, *Williams 2047:* Manila, *Merrill 49, McGregor 39:* Province of Rizal, *Merrill 2730, 1880:* Province of Tayabas, *Whitford 566:* Province of Albay, *Bur. Sci. 2897 Mearns.* PANAY, *For. Bur. 113 Gammill.* BASILAN, *For. Bur. 3970 Hutchinson.*

Native names: *Agho* (Panay); *datels* (Leyte); *comcompitis* (Ilocos Sur); in some provinces (Cavite, Pampanga, Rizal, Nueva Ecija, etc.), erroneously called *acle*, which properly belongs to *Albizzia acle.*

A native of tropical America, now widely distributed in tropical and subtropical parts of the world; very abundant and widely distributed in the Philippines at low altitudes, the timber being used for house posts and for firewood. In Leyte the seeds are used by the natives as a substitute for coffee.

8. SCHRANKIA Willd.

1. **Schrankia quadrivalvis** (Linn.) comb. nov.

Mimosa quadrivalvis Linn. Sp. Pl. (1753) 522; Blanco Fl. Filip. (1837) 732, ed. **2** (1845) 506, ed. 3, **3:** 135.

Schrankia aculeata Willd. Sp. Pl. **4** (1805) 1041; Benth. in Trans. Linn. Soc. **30** (1875) 441; F.-Vill. Nov. App. (1880) 74.

MINDANAO, Province of Misamis, Cagayan, *L. Borja*, December, 1907. LUZON, Province of Batangas, Bauang (*fide Blanco*).

This genus is confined entirely to America, except for the above species which appears to be the only one that has established itself in the East. It was probably introduced into the Philippines at the time the colony was governed as a dependency of Mexico, when all communication between Spain and the Philippines was via Vera Cruz and Acapulco, Mexico. In spite of its apparently early introduction, it does not appear to be at all common in the Philippines. The earliest specific name is adopted.

Native name: *Bulong-siri* (Misamis).

[13] Journ. As. Soc. Beng. **66** [2] (1897) 250.

9. MIMOSA Linn.

1. **Mimosa pudica** Linn. Sp. Pl. (1753) 518; Willd. Sp. Pl. 4 (1805) 1031; Benth. in Trans. Linn. Soc. 30 (1875) 397; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 291; Naves in Blanco Fl. Filip. ed. 3, *pl. 253.*

Mimosa asperata Blanco Fl. Filip. (1837) 732, ed. 2 (1845) 505, ed. 3, **3:** 134, non Linn.

LUZON, Province of Isabela, *Merrill 199:* Province of Benguet, *Williams 919:* Province of Union, *Elmer 5573:* Manila, *Merrill 3468:* Province of Pangasinan, *Merrill 2867:* Province of Rizal, *For. Bur. 3195 Ahern's collector:* Province of Tayabas, *For. Bur. 7468 Reyes, Gregory 28, Merrill 2417:* Province of Albay, *Bur. Sci. 6257 Robinson.* POLILLO, *Bur. Sci. 9211 Robinson.* CEBU, *Barrow 12.* PANAY, *Yoder 18.*

Universally known among the natives as *macahia* (literally "ashamed"). The sensitive plant.

Throughout the Philippines at low altitudes, in open lands. A native of tropical America, now widely distributed in the tropics of the world, and in many regions an extremely troublesome weed.

DOUBTFUL SPECIES.

MIMOSA BLANCOANA Llanos Mem. Acad. Cienc. Madrid 4 (1858) 503; Blanco Fl. Filip. ed. 3, 4 [1] (1880) 103.

Nothing at all agreeing with the very imperfect description has been recently collected in the Philippines; it is possible that the description was based in part on fragmentary material of *Entada scandens.* It is not a *Mimosa.*

10. PROSOPIS Linn.

1. **Prosopis vidaliana** Naves in Ephem. "Oriente" (1877) *fide* F.-Villar, "Prosopis vidaliana" (1877) 1–19, *pl. 1, 2,* Blanco Fl. Filip. ed. 3, *pl. 392;* Vidal Cat. Pl. Prov. Manila (1880) 28, Sinopsis Atlas (1883) *t. 44, fig. C.*

Prosopis juliflora F.-Vill. Nov. App. (1880) 73; Perk. Frag. Fl. Philip. (1904) 7, non DC.

LUZON, Manila, *Merrill 370:* Province of Rizal, *Feliciano 291:* Province of Bataan, *Williams 379, For. Bur. 5934, 15562 Curran, Decades Philip. Forest Fl. no. 192 Borden, For. Bur. 56 Barnes.* BASILAN, *Hallier s. n., DeVore & Hoover 72.*

This species was originally described by Naves in a daily or weekly paper published in Manila, and in the same year redescribed in detail and illustrated by two plates in a pamphlet entitled "Prosopis Vidaliana Naves. Descripción de la espécie botanica Prosopis Vidaliana de la Flora de Filipinas" issued to subscribers to the third edition of Blanco's "Flora de Filipinas." It was later reduced by F.-Villar to *Prosopis juliflora* (Sw.) DC. which reduction has been accepted by recent authors.

Having noticed that the Philippine material differed remarkably from the single American specimen in this herbarium labeled *Prosopis juliflora,* I asked Dr. J. N. Rose to compare the Philippine material in the United States National Herbarium with American specimens of *Prosopis.* This he has kindly done, and writes as follows: "I do not think your species is the same as any of our United States ones. It is not the same as the one of central and southern Mexico, which is probably *P. dulcis.* Neither do I think that it is *P. juliflora* of the West Indies. It resembles very much some unidentified material of mine from the west coast [of Mexico]. The pods of your Philippine plants are rather

peculiar in that they are straight below and with rather an abrupt bend near the top. It is a constant character."

I feel rather confident that this species is a native of Mexico, and that it was introduced into the Philippines at the time when communication with Spain and Manila was via Vera Cruz and Acapulco, in spite of the fact that it was not described by Father Blanco. While it is undoubtedly allied to *Prosopis juliflora*, and may possibly be interpreted as an extreme form of that variable species, it is considered best to retain it as a distinct species for the present.

11. **ADENANTHERA** Linn.

1. **Adenanthera intermedia** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 228.

Mimosa virgata Blanco Fl. Filip. (1837) 737, non Linn.

Mimosa punctata Blanco l. c. ed. 2 (1845) 508, ed. 3, **3**: 139, non Linn.

Adenanthera pavonina Auct. Philip., non Linn.

Widely distributed in the Philippines at low altitudes, represented by numerous specimens cited by myself l. c.

Native names: *Tanglin* (Bataan); *malabago* (Masbate); *baguiroro* (Albay); *pamiasin* (Zambales); *ipil-tanglin, butario* (Cagayan); *malasagad* (Rizal); *quinasacasai*, ex Blanco.

Endemic.

12. **ENTADA** Adans.

Leaflets 3 to 10 cm long; pods 0.5 to 1 m long..... 1. *E. scandens*
Leaflets less than 1.5 cm long; pods 10 to 25 cm long..... 2. *E. parvifolia*

1. **Entada scandens** (Linn.) Benth. in Hook. Journ. Bot. **4** (1842) 332, Trans. Linn. Soc. **30** (1875) 363; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 287; F.-Vill. Nov. App. (1880) 73; Vid. Sinopsis Atlas (1883) *t. 44, fig. A.*

Mimosa scandens Linn. Sp. Pl. ed. 2 (1763) 1501.

Mimosa entada Linn. Sp. Pl. (1753) 518.

Adenanthera gogo Blanco Fl. Filip. (1837) 353.

Entada pursaetha DC. Prodr. **2** (1825) 425; Blanco Fl. Filip. ed. 2 (1845) 247, ed. 3, **2**: 96.

LUZON, Province of Cagayan, *For. Bur. 16982 Bacani:* Province of Abra, *For. Bur. 16564 Darling:* Province of Benguet, *Elmer 8977:* Province of Pangasinan, *Alberto 48:* Province of Rizal, *For. Bur. 2901 Ahern's collector:* Province of Bataan, *For. Bur. 2542 Borden:* Province of Camarines, *For. Bur. 12256 Curran.* POLILLO, *Bur. Sci. 9247, 9269 Robinson.* MINDORO, *For. Bur. 11423 Merritt.* PALAWAN, *For. Bur. 4500 Curran.* LEYTE, *For. Bur. 12450 Danao.* MINDANAO, *Mrs. Clemens 365.*

Native names: *Gogo* (in most Provinces in Luzon); *barugo* (Leyte); *balugo* (Mindoro); *lipai* (Abra, Ilocos Sur & Norte, Union); *bayogo, gogong-bacay*, ex Blanco.

Widely distributed in the tropics of the world, in the Philippines common, especially at low altitudes, the stems extensively used as a substitute for soap.

The nomenclature of this genus and species is somewhat complicated, and in accepting the above binomial I have followed general usage. As to the genus, *Entada* was first published in 1763 [14] but is not the earliest proposed name. O. Kuntze [15] has adopted the generic name *Pusaetha* Linn. Fl. Zeyl. (1747) 236, in which he has been followed by Taubert,[16] but this name as a genus apparently

[14] Adans. Fam. **2** (1763) 318.
[15] Rev. Gen. Pl. (1891) 204.
[16] Engl. & Prantl Nat. Pflanzenfam. **3**[3] (1894) 122.

has no standing according to any generally accepted rules, as it was not adopted by Linnaeus in his later works, and can hence be ignored. *Gigalobium*[17] is another synonym, but as to the validity of the publication of this as a generic name, I am unable to determine, as the work in question is not available here. Recently W. F. Wight[18] has taken up the binomial "*Lens phaseoloides* Stickman Herb. Amb. 1754; Amoen. Acad. **4**: 128, 1759," which may be the earliest valid generic name, but which is apparently not the earliest specific designation; the generic name has moreover been generally adopted by later authors for an entirely different genus in the same family, and it is not reasonable to suppose than many botanists will willingly follow Wight's lead in adopting the generic name *Lens* in place of *Entada*, which will necessitate a new generic designation for the genus *Lens* Gren. & Godr., which in turn, according to "Index Kewensis," was based on the much earlier *Lens* (Tourn.) Linn. Syst. ed. 1 (1735). The case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress.

As to the specific name, the earliest valid one is apparently *Mimosa entada* Linn. Sp. Pl. (1753) 518, based on Fl. Zeyl. 219, and *Entada* Rheede Hort. Malabar. **9**: 151, *t. 67* (later authors, Trimen, Baker, etc., cite the plate as *t.* 77). According to Trimen[19] both references are *Entada scandens*. Bentham[20] has, however, referred *Mimosa entada* Linn. to *Entada polystachya* DC., an American species, after examining the specimen in the Linnean Herbarium. The specimen is, however, not the type of the species, and accordingly has no bearing on the case.

2. **Entada parvifolia** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 229.

Luzon, Province of Zambales, *Hallier s. n., Bur. Sci. 4810, 5067 Ramos:* Province of Bataan, *For. Bur. 20028 Topacio.*

Native name: *Hinagui.*

Used as a substitute for soap.

Endemic.

13. PARKIA R. Br.

1. **Parkia timoriana** (DC.) comb. nov.

Inga timoriana DC. Prodr. **2** (1825) 442.

Mimosa biglobosa Roxb. Fl. Ind. **2** (1832) 551, non Jacq.

Parkia roxburghii G. Don Gen. Syst. **2** (1832) 397; Benth. in Trans. Linn. Soc. **30** (1875) 360; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 289; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 239; F.-Vill. Nov. App. (1880) 74; Vid. Sinopsis Atlas (1883) *t. 44, fig. D,* Rev. Pl. Vasc. Filip. (1886) 119; Perk. Frag. Fl. Philip. (1904) 7; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 62.

Acacia niopo Llanos Mem. Acad. Cienc. Madrid **4** (1858) 508, non HBK.

Mimosa peregrina Blanco Fl. Filip. (1837) 737, ed. 2 (1845) 509, ed. 3, **3**: 139, non Linn.

Luzon, without locality, *Loher 2182:* Province of Zambales, *For. Bur. 5986 Curran:* Province of Bataan, *For. Bur. 89, 323 Barnes, Decades Philip. Forest Fl. no. 79 Barnes, Merrill 1530, 5142, Elmer 6888, For. Bur. 1290, 1320, 1518, 1549, 1614, 1626, 2132 Borden, Bur. Sci. 1569 Foxworthy, For. Bur. 5275 Curran:* Manila, *Ahern 702:* Province of Tayabas, *For. Bur. 17 Ware.* Palawan, *For. Bur. 5183 Manalo.*

Widely distributed in the Philippines at low altitudes, indigenous, never cultivated; quite universally known as *cupang.* Timor (typical form); cultivated

[17] P. Br. Hist. Jamaic. (1756) 362.

[18] Contr. U. S. Nat. Herb. **9** (1905) 307, 308, *pl. LVI.*

[19] Fl. Ceylon **2** (1894) 119.

[20] Trans. Linn. Soc. **30** (1875) 364.

in Java, and, according to Prain, in Indo-China, wild in Silhet, Cachar, and Chittagong.

Inga timoriana DC. was reduced by Bentham to *Parkia roxburghii* G. Don, and following the principles of priority, the earliest specific name must be adopted. In order to be sure of the identity of the Philippine plant with DeCandolle's species, material comprising flowers, fruits, and leaves of the Philippine plant, as well as fragments of two species cultivated in the Botanic Garden at Buitenzorg, labeled *Parkia intermedia* Hassk., and *P. roxburghii* G. Don, was sent to M. C. DeCandolle for comparison with the type of *Inga timoriana* DC. I am indebted to him for the following statement: "I have entrusted to M. Buser the comparisons you desired to be made of three specimens of *Parkia* with *Inga timoriana* DC. and *Parkia Roxburghii* Don, and of the latter with what we have here under *P. intermedia* Hassk., in view of ascertaining if they are distinct species. M. Buser has submitted to me his following conclusions in which I entirely concur.

" 'Taking for the type of *Parkia intermedia* Hassk. the plant distributed under this name by Zollinger (n. 3586) there exists a complete identity with *intermedia* for the plant "ex Hort. Bot. Bogor. cult." under the name of *P. Roxburghii*, but not for the plant labeled, *ibidem*, *P. intermedia* Hassk.

" '*P. intermedia* Hassk. (=Zollinger n. 3586, n. 736) and *P. Roxburghii* G. Don (Wall. Cat. 5288) are certainly two distinct species (see leaflets and floral characters).

" '*Inga ? timoriana* DC. is the same plant as Barnes 323=*P. intermedia* Hort. Bogor. cult., and quite different from true *P. intermedia* Hassk. In a broad sense it may be identified with *P. Roxburghii* Don, as done by Bentham; in a more restricted specific conception it may be regarded as a species of secondary order.

" '**Roxburghii**: rhachide rotundato-angulata, foliolis utrinque glaberrimis, margine adpresse ciliatis, subconcoloribus, costa tenui, nervis secundariis inconspicuis, rhachilla tenuiore. Corollae segmentis extus hirsutis.

" '**Timoriana**: rhachide quadrangulari, foliolis utrinque, supra praesertim, plus minus pilosis, subtus pallidioribus, costa latiuscula, nervis secundariis supra subreticulate-prominulis, rhachilla latiore; corollae segmentis (Barnes 89) glaberrimis.' "

The specimens sent for comparison were *For. Bur. 323 Barnes* (leaves and fruits), with flowers of *For. Bur. 89 Barnes* from the same locality (Lamao River, Province of Bataan, Luzon), and two specimens from trees cultivated in the Botanic Garden at Buitenzorg, Java, one labeled "Cult. in Hort. Bog. I, B, 51, *Parkia intermedia* Hassk.," which is not Hasskarl's species, but is *Parkia timoriana*, and the other labeled "I, B, 4=48=50, *Parkia Roxburghii* Don," which is not Don's species but is *P. intermedia* Hassk. Prain [21] who has worked over the species of *Parkia* occurring in the Malay Peninsula, also expresses the opinion that *P. roxburghii* Don, and *P. intermedia* Hassk., are distinct. Comparative studies with a full series of specimens of typical *P. roxburghii* G. Don, and *P. timoriana* may show the distinguishing characters indicated above to be constant, and the two species worthy of specific rank, a point that is left for some future monographer to decide.

[21] Journ. As. Soc. Beng. **66** [2] (1897) 240.

14. ERYTHROPHLOEUM Afzel.

1. **Erythrophloeum densiflorum** (Elm.) Merr. in Philip. Journ. Sci. 4 (1909) Bot. 267.

Cynometra densiflora Elmer Leafl. Philip. Bot. 1 (1907) 222.

LUZON, Province of Cagayan, *For. Bur. 17198 Curran:* Province of Tayabas, *Elmer 9014* (type number), *For. Bur. 10154, 10215, 10272 Curran, For. Bur. 11513 Whitford, For. Bur. 12507 Rosenblunth.* MINDANAO, District of Zamboanga, *For. Bur. 9163 Whitford & Hutchinson* (probably, specimen sterile).

Native names: *Camatog, calamantao, tacloban* (Tayabas); *salsal* (Cagayan).

Endemic. Widely distributed in the Philippines at low and medium altitudes.

The generic distribution is peculiar, about five species being found in tropical Africa and Madagascar, one in Australia, one in the Philippines, and one in southern China.

Since the above transfer to *Erythrophloeum* was published, I have received a note from the Director of the Royal Gardens, Kew, verifying its correctness.

15. CYNOMETRA Linn.

Flowers on the stem and thick branches in racemes with a produced axis; pedicels glabrous; leaflets 1-jugate ..... 1. *C. cauliflora*

Flowers in the leaf-axils on the branchlets, in racemes or corymbs without a produced axis; pedicels puberulous.

Leaves pinnate, the leaflets 1-2-jugate.

Leaflets 2-jugate, the lower pair usually very much smaller than the upper.

Leaflets usually blunt-acuminate, the acumen broad and retuse at the apex; pods not or but slightly rugose ..... 2. *C. inaequifolia*

Leaflets usually acuminate, sometimes rounded, but scarcely retuse at the apex; pods rugose ..... 3. *C. bijuga*

Leaflets 1-jugate.

Leaflets 10 to 14 cm long ..... 4. *C. ramiflora*

Leaflets 1 to 6 cm long ..... 5. *C. warburgii*

Leaves reduced to single leaflets.

Leaflets up to 12 cm long, the apex sharply acuminate, the base broad, rounded, subcordate ..... 6. *C. luzoniensis*

Leaflets usually less than 10 cm in length, the apex broadly and bluntly acuminate, the base narrowed, acute ..... 7. *C. simplicifolia*

1. **Cynometra cauliflora** Linn. Sp. Pl. (1753) 382; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 268; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 197; F.-Vill. Nov. App. (1880) 71; Vidal Sinopsis Atlas (1883) *t. 43, fig. H;* Naves in Blanco Fl. Filip. ed. 3, *pl. 213.*

Cynometra acutiflora Vid. Rev. Pl. Vasc. Filip. (1886) 118, sphalm.

LUZON, Manila, *Vidal 1278, Loher 2205,* in Herb. Kew., from a specimen cultivated in the old Botanical Garden.

This species has properly no place in the Philippine flora, except as a cultivated plant, or one that was cultivated, as the tree from which Vidal and Loher collected their material is no longer in existence. Loher's specimen is labeled as having been collected in the Botanical Garden, but Vidal's specimen bears only the label "Luzon;" in his "Revision," however, he adds Manila, and tracing the matter back further, we find that his drawing in the "Sinopsis Atlas," was from this Botanical Garden specimen. F.-Villar's referenee is undoubtedly to this same tree.

Malaya; cultivated occasionally in India and the Malay Peninsula, *fide* Prain. Koorders[22] says that in Java it is cultivated for its edible fruit, and thinks it probably a native of India.

2. **Cynometra inaequifolia** A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 473; F.-Vill. Nov. App. (1880) 71; Vid. Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 118; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 63, **3** (1908) Bot. 82.

Schotia speciosa Blanco Fl. Filip. (1837) 356, ed. 2 (1845) 251, ed. 3, **2**: 100, non Jacq.

LUZON, Province of Cagayan, *Cuming 1297* in Herb. Kew.: Province of Zambales, *For. Bur. 11038 Zschokke:* Province of Laguna, *Wilkes Expedition* in U. S. Nat. Herb. (type), *For. Bur. 10053 Curran:* Province of Batangas, *For. Bur. 7629 Curran & Merritt:* Province of Bataan, *Whitford s. n.:* Province of Rizal, *Merrill 1861, 2674, For. Bur. 2883 Ahern's collector, Bur. Sci. 3336 Ramos.*

Native names: *Dila-dila, cabilian* (Rizal); *palanapoy* (Zambales); *balitbitan,* ex Blanco.

Endemic?

This species has been reported from the Malay Peninsula by Baker[23] and Prain,[24] but from the extended description given by the latter it seems to me that the form from the Malay Peninsula is distinct from that of Luzon, that is, true *Cynometra inaequifolia* A. Gray. The species is very closely allied to *C. bijuga* Spanoghe, and seems to be distinguishable only by comparatively trivial characters, larger, rather more coriaceous leaves which are somewhat pale beneath, their apices obscurely broad-acuminate and somewhat retuse, the veins and reticulations prominent, not obscure as stated by Prain for this species, and its nearly smooth or only slightly rugose pods.

3. **Cynometra bijuga** Spanoghe in Linnaea **15** (1841) 201, nomen; Miq. Fl. Ind. Bat. **1**[1] (1855) 78; Perk. Frag. Fl. Philip. (1904) 7.

Cynometra ramiflora subsp. *bijuga* Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 198.

LUZON, Province of Zambales, *Hallier s. n.* LEYTE, *For. Bur. 12727 Rosenbluth.* PALAWAN, *For. Bur. 3785 Curran.*

Var. **mimosoides** (Wall.).

Cynometra mimosoides Wall. Cat. (1832) No. 5817.

Cynometra ramiflora var. *mimosoides* Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 267; Prain l. c.

PANAY, *Cuming 1652.* MINDANAO, *For. Bur. 11555 Whitford,* leaves only.

What I take to be typical *Cynometra bijuga* Spanoghe (*C. ramiflora* var. *heterophylla* Thwaites) extends, according to Prain, from Ceylon to the Andaman Islands, Johore, Perak, Singapore, Sumatra, Java, Borneo, and Timor. As to the specific name, Prain suggests that *Cynometra mimosoides* Wall. should be taken up according to strict priority, but like the original publication of *C. bijuga, C. mimosoides* was a *nomen nudum. C. bijuga* Spanoghe was, however, described in 1855, but I have found no record of a printed description of *C. mimosoides* Wall. before the year 1878, and then only as a variety of *C. ramiflora.* The var. *mimosoides* extends from Ceylon to India and the Andaman Islands.

[22] Meded. 's Lands Plantent. **11** (1894) 271.
[23] Hook. f. Fl. Brit. Ind. **2** (1878) 267.
[24] Journ. As. Soc. Beng. **66**[2] (1897) 199.

4. **Cynometra ramiflora** Linn. Sp. Pl. (1753) 382, excl. syn. Rheede Hort. Malabar. **4**: 65, *t. 31;* Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 267; F.-Vill. Nov. App. (1880) 71; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 197, var. *genuina.*

LUZON, Province of Cagayan, *For. Bur. 16967 Curran:* Province of Bulacan, *For. Bur. 7214 Curran:* Province of Tayabas (Infanta), *Whitford 847.*

Native name: *Comon* (Cagayan).

Ceylon to Java, Ceram, Amboina, and (?) northern Australia.

From an examination of the available Philippine and the scanty extra-Philippine material available here, I am inclined to consider this form specifically distinct from *C. bijuga* Spanoghe, its leaves apparently always being 1-jugate, while in the latter species they are 2-jugate. The specimens cited above are a very close match for *t. 63* of Rumphius's "Herbarium Amboinense," the first figure cited by Linnaeus in establishing the species. The typical and allied forms have been fully discussed by Prain, *l. c.*

5. **Cynometra warburgii** Harms in Notizbl. Kgl. Bot. Gart. Berlin **3** (1902) 187.

LUZON, Province of Cagayan, *Warburg 12427, 12086* in Herb. Berol.

Endemic.

Characterized by its 1-jugate, comparatively small leaflets.

6. **Cynometra luzoniensis** Merr. in Philip. Journ. Sci. **4** (1909) Bot. 266.

LUZON, Province of Tayabas, *Merrill 2128.*

Characterized by its simple leaves, the solitary leaflet sharply acuminate at the apex, the base broad, rounded and subcordate.

Endemic.

7. **Cynometra simplicifolia** Harms in Notizbl. Kgl. Bot. Gart. Berlin **3** (1902) 186; Merr. in Philip. Journ. Sci. **1** (1908) Suppl. 63.

LUZON, Province of Ilocos Sur, *Cuming 1134* (type number): Povince of Nueva Ecija, *For. Bur. 6035 Zschokke:* Province of Bataan, *For. Bur. 1737 Borden, Whitford s. n., For. Bur. 6390 Curran:* Province of Batangas, *For. Bur. 7628 Curran & Merritt:* Province of Tayabas, *For. Bur. 10351 Curran.* MINDORO, *Bur. Sci. 1537 Bermejos, For. Bur. 9908 Merritt.* MINDANAO, District of Davao, *For. Bur. 11549 Whitford.* BASILAN, *Hallier s. n.*

Native names: *Malatumbaga* (Nueva Ecija); *macanit* (Tayabas); *lanis* (Davao); *betis* (Batangas).

Endemic.

Var. **oblongata** var. nov.

Differt a typo foliis longioribus, oblongo-lanceolatis ad oblongo-ellipticis, sensim acuminatis, usque ad 14 cm longis.

The leaves are subcoriaceous, not pale beneath as is usually the case with *C. simplicifolia,* shining on both surfaces, gradually narrowed above to the apex, not blunt-acuminate, the base acute. The fruits are about 3 cm long and 2.2 cm wide, compressed, wrinkled when dry. Flowers unknown.

LUZON, Province of Rizal, *For. Bur. 2978 Ahern's collector, Bur. Sci. 3349, 5216 Ramos.* Locally known as *dila-dila.*

The specimens are all in fruit, and it seems probable that when flowers are collected that it will be found to be specifically distinct from *C. simplicifolia* Harms.

16. KINGIODENDRON Harms.

1. **Kingiodendron alternifolium** (Elmer) Merr. & Rolfe in Philip. Journ. Sci. 4 (1909) Bot. 267.

Cynometra alternifolia Elmer Leafl. Philip. Bot. 1 (1907) 223.

Hardwickia alternifolia Elmer l. c. 362.

LUZON, Province of Cagayan, *For. Bur. 14722 Darling:* Province of Tayabas, *For. Bur. 10327, 10354 Curran, Bath s. n.:* Province of Camarines, *For. Bur. 10671 Curran:* Province of Sorsogon, *For. Bur. 10624 Curran:* Province of Albay, *For. Bur. 15082 Rosenbluth.* MASBATE, *Merrill 2761, Whitford 1679, For. Bur. 12668 Rosenbluth.* TICAO, *For. Bur. 12546 Rosenbluth, For. Bur. 1084 Clark.* SAMAR, *For. Bur. 12851 Rosenbluth.* PANAY, *Vidal 2468* in Herb. Kew. LEYTE, *For. Bur. 12711 Rosenbluth, Elmer 7366* (type number). MINDANAO, District of Zamboanga, *For. Bur. 9007, 9301 Whitford & Hutchinson, For. Bur. 11036 Whitford; For. Bur. 6567 Hutchinson;* District of Davao, Samal Island, *For. Bur. 11550 Whitford.*

Native names: *Batete* (Ticao, Masbate); *dangay* (Tayabas, Camarines, Albay, Masbate); *magbalogo* (Samar); *salalangin* (Sorsogon); *duca* (Leyte); *palina* (Davao); *palo maria, bitanhol* (Zamboanga).

A genus of two known species, one in British India, and one in the Philippines. Endemic.

17. SINDORA Miq.

1. **Sindora supa** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 198.

Sindora wallichii F.-Vill. Nov. App. (1880) 71; Vid. Sinopsis Atlas (1883) *t. 43, fig. C,* Rev. Pl. Vasc. Filip. (1886) 118, non Benth.

LUZON, Province of Tayabas, *For. Bur. 23 Ware, Whitford 910, For. Bur. 859, 860 Bath, Merrill 1010, 2021, 2596, 2611, For. Bur. 7098 Kobbe, For. Bur. 10232, 10240, 10332 Curran:* Province of Camarines, *For. Bur. 4533 Barredo, For. Bur. 10653 Curran:* Province of Albay, *For. Bur. 6678 Pray, For. Bur. 10592 Curran.* MINDORO, *For. Bur. 9863 Merritt.*

Almost universally known as *supa,* less commonly, and more especially the oil, as *manapo;* in Albay also known as *pauna.*

Endemic.

Very closely allied to *Sindora wallichii* Benth. of the Malay Peninsula.

As to the generic name, the question has been fully discussed by Prain,[25] who calls attention to the fact that the earliest figure and description of any species in the genus is *Caju Galedupa* of Rumph. Herb. Amboinense **2:** 59, *t. 13,* on which, with *Pongam* of Rheede Hort. Malabar. **6:** *t. 3,* Lamarck in 1786 based his genus *Galedupa.* The first citation given by Lamarck is to Rumphius's plate, from which also the generic name was taken. Technically, according to strict priority, the generic name for the species now placed under *Sindora* should be *Galedupa,* as Rumphius's figure is apparently a *Sindora,* and by no means the same as *Pongam* of Rheede. To complicate the matter, however, Lamarck's description both of the genus *Galedupa,* and the species *G. indica,* applies to *Pongam* of Rheede, as noted by Prain, and not at all to *Caju Galedupa* of Rumphius. In consideration of this fact I am of the opinion that *Galedupa* Lam., should be referred to *Pongamia* Vent., and that *Sindora* should be retained for the present genus. The case is not directly covered by the list of *nomina conservanda* of the Vienna Botanical Congress.

[25] Journ. As. Soc. Beng. **66**[2] (1897) 202, 479.

18. **CRUDIA** Schreb.

Leaflets 5 to 9, 4 to 8 or 9 cm long..... 1. *C. blancoi*
Leaflets 1 or 2, 11 to 13 cm long..... 2. *C. subsimplicifolia*

1. **Crudia blancoi** Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 309; Vid. Phan. Cuming. Philip. (1886) 118.

Crudia spicata Blanco Fl. Filip. ed. 2 (1845) 261, ed. 3, **2**: 121; Naves l. c. ed. 3, *pl. 244;* F.-Vill. Nov. App. (1880) 71; Vid. Sinopsis Atlas (1883) *t. 43, fig. B,* non Willd.

Apalatoa blancoi Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 19.

LUZON, Province of Pangasinan, *Merrill s. n.:* Province of Laguna, *For. Bur. 10082 Curran:* Province of Rizal, *For. Bur. 2661, 2956, 3074, 3136 Ahern's collector, Bur. Sci. 2142, 3559 Ramos, Merrill 2658:* Province of Camarines, *For. Bur. 10775 Curran:* Province of Bulacan, *Mrs. Templeton.*

Native name: *Malatumbaga* (Rizal, Laguna); *calatumbaga* (Bulacan).

Endemic.

Blanco's description is imperfect, and in some respects erroneous, probably due to a mixture of material, as suggested by F.-Villar.

2. **Crudia subsimplicifolia** sp. nov.

Arbor glabra, usque ad 10 m alta; foliis alternis, uni- vel bifoliolatis, foliolis oblongis vel elliptico-oblongis, subcoriaceis, usque ad 13 cm longis, basi acutis, apice admodum abrupte acute acuminatis; racemis axillaribus, solitariis vel binis, quam folia brevioribus.

A glabrous tree about 10 m high. Branches terete, light-grayish-brown. Leaves alternate, pinnate, sometimes with one leaflet, sometimes with two, but the leaflets when two never opposite. Petiole and rachis rather stout, about 1 cm long. Leaflets oblong or elliptic-oblong, subcoriaceous, slightly shining when dry and paler beneath than on the upper surface, the base acute, the apex rather abruptly and sharply acuminate, the acumen 1 to 1.5 cm long; nerves 7 or 8 on each side of the midrib, anastomosing, the reticulations distinct; petiolules stout, about 3 mm long. Racemes axillary, solitary or in pairs, 6 cm long or less (young), glabrous, or with very few short hairs; pedicels short, about 1 mm long, each subtended by a small, slightly ciliate-hairy bracteole. Sepals 4, in bud 2 to 2.5 mm long. Stamens 10. Ovary densely hairy.

LUZON, Province of Cagayan, San Vicente, *For. Bur. 4287 Klemme,* June, 1906, a specimen with immature flowers, altitude about 10 m. Locally known to the Negritos as *Tambali.*

A species manifestly closely allied to **Crudia bantamensis** (Hassk.) (*Touchiroa bantamensis* Hassk.; *Pryona bantamensis* Miq.), differing in its sharply acuminate, smaller leaflets, and glabrous or nearly glabrous racemes which are shorter than the leaves.

The oldest names for the genus are *Apalatoa* Aubl. and *Touchiroa* Aubl., but *Crudia* is here retained, following the list of *nomina conservanda* of the Vienna Botanical Congress. Prain notes that *Apalatoa* was based on a mixture of flowers of this genus and fruits of *Pterocarpus.*

19. **TAMARINDUS** Linn.

1. **Tamarindus indica** Linn. Sp. Pl. (1753) 34; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 273; Blanco Fl. Filip. (1837) 29, ed. 2 (1845) 20, ed. 3, **1**: 39, Naves l. c. ed. 3, *pl. 14;* Vid. Sinopsis Atlas, *t. 43, fig. D.*

Widely distributed in the Philippines, especially in and about towns, apparently not indigenous in the Philippines, but introduced in prehistoric times. Probably a native of tropical Africa; planted throughout the tropics.

Native names: Tagalog *sampaloc;* Ilocano *salomague, salumagul;* Bicol *sambac;* Visayan *sambagui, sambag, sambalagui.* The Tamarind.

20. **INTSIA** Thouars.

Leaflets 4-jugate, sometimes 3-jugate, distinctly but shortly acuminate, mostly less than 8 cm long, rather firmly coriaceous..... 1. *I. acuminata*

Leaflets usually 2-jugate, sometimes 3-jugate, apex broad, rounded and retuse, or broadly acuminate, up to 14 cm in length, often much smaller, subcoriaceous or chartaceous ..... 2. *I. bijuga*

1. **Intsia acuminata** Merr. in Govt. Lab. Publ. (Philip.) **17** (1904) 20.

LUZON, Province of Cagayan, *For. Bur. 7063, 11318 Klemme:* Province of Tayabas, *Merrill 1108* (Infanta), *2584, 2594, For. Bur. 1413 Klemme.*

Native names: *Balahian* (Cagayan); *tindalo, ipil* (Tayabas).

Manifestly closely allied to the next, and like it a seacoast plant, but usually distinguishable by its more numerous, smaller, and thicker leaflets.

Endemic.

2. **Intsia bijuga** (Colebr.) O. Kuntze Rev. Gen. Pl. (1891) 192; Prain in Sci. Mem. Med. Off. Ind. Army **12** (1901) 12; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 63, **3** (1908) Bot. 409.

Macrolobium bijugum Colebr. Trans. Linn. Soc. **12** (1817) 359, *t. 17.*

Afzelia bijuga A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 467, *t. 51;* Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 274; F.-Vill. Nov. App. (1880) 72; Vid. Sinopsis Atlas (1883) *t. 42, fig. B;* Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 208.

Eperua decandra Blanco Fl. Filip. (1837) 368, ed. 2 (1845) 259, ed. 3, **2**: 118.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4036 Fénix.* LUZON, Province of Cagayan, *For. Bur. 17267 Curran:* Province of Zambales, *Merrill 1750:* Province of Bataan, *Whitford 1318, For. Bur. 5953 Curran:* Province of Tayabas, *Merrill 1054, 1986, For. Bur. 840 Hagger, For. Bur. 10205, 10347 Curran:* Province of Camarines, *For. Bur. 10663, 10684 Curran:* Province of Sorsogon, *For. Bur. 10595 Curran.* MINDORO, *For. Bur. 5373, 8537, 9877 Merritt, Merrill 2184, 2250.* PALAWAN, *For. Bur. 3496, 4522, 5181 Curran, Bur. Sci. 801 Foxworthy.* MASBATE, *For. Bur. 12821, 12593, 12598 Rosenbluth.* TICAO, *For. Bur. 12527 Rosenbluth, For. Bur. 1078 Clark.* PANAY, *Copeland s. n.* LEYTE, *For. Bur. 7133 Everett, For. Bur. 12634 Rosenbluth.* GUIMARAS, *For. Bur. 215 Gammill.* NEGROS, *For. Bur. 7306, 5605, 5622 Everett, For. Bur. 12414, 15037 Danao.* DINAGAT, *For. Bur. 15054 Sample.* MINDANAO, *For. Bur. 3954, 9497, 9522, 12370 Hutchinson.* BASILAN, *For. Bur. 6093 Hutchinson.*

Widely distributed along the seacoast throughout the Philippines; a very important timber tree, universally known as *ipil.* Madagascar, Seychelles, Andaman and Nicobar Islands, throughout Malaya to New Guinea, the Fiji and Caroline Islands.

For a complete synonymy of *Intsia bijugà,* and discussion of the allied genera,

see Prain's valuable paper "On the Characters and Relationships of Afzelia (Smith)," Scientific Memoirs by Medical Officers of the Indian Army **12** (1901) 1–17, *plate*.

EXCLUDED SPECIES.

AFZELIA PALEMBANCIA (Miq.) Baker; F.-Vill. Nov. App. (1880) 72.

A Malayan species, not known from the Philippines. Probably an erroneous identification for some form of *Intsia bijuga*, or *I. acuminata*.

21. PAHUDIA Miq.

1. **Pahudia rhomboidea** (Blanco) Prain in Sci. Mem. Med. Off. Ind. Army **12** (1901) 14; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 63.

Eperua falcata Blanco Fl. Filip. (1837) 369, non Aubl.

Eperua rhomboidea Blanco l. c. ed. 2 (1845) 260, ed. 3, **2:** 119; Naves l. c. ed. 3, *pl. 281*.

Afzelia rhomboidea Vid. Cat. Pl. Prov. Manila (1880) 28, Phan. Cuming. Philip. (1885) 110, Sinopsis Atlas (1883) *t. 42, fig. A*, Rev. Pl. Vasc. Filip. (1886) 117; F.-Vill. Nov. App. (1880) 72.

LUZON, Province of Cagayan, *For. Bur. 16926, 17276, 17043, 17297 Curran, For. Bur. 18511, 18515 Alvarez:* Province of Isabela, *For. Bur. 6639, 6642 Klemme:* Province of Zambales, *For. Bur. 5898 Curran:* Province of Pangasinan, *For. Bur. 8386 Curran & Merritt:* Province of Rizal, *For. Bur. 3263 Ahern's collector, Decades Philip. Forest Fl. no. 211 Ahern's collector, Merrill 2651:* Province of Bataan, *For. Bur. 2046, 2570 Borden, For. Bur. 2591 Meyer, For. Bur. 5450 Curran:* Province of Tayabas, *For. Bur. 10315 Curran, Merrill 2001, For. Bur. 18 Ware:* Province of Camarines, *Ahern 146, For. Bur. 10661 Curran:* Province of Sorsogon, *For. Bur. 6686 Pray, For. Bur. 15079 Rosenbluth, For. Bur. 5161 Bridges.* POLILLO, *Bur. Sci. 6982 Robinson.* MINDORO, *For. Bur. 6735, 6739 Merritt, For. Bur. 12241 Rosenbluth.* MARINDUQUE, *For. Bur. 12164, 12185 Rosenbluth.* CULION, *Ahern 704.* TICAO, *For. Bur. 1089 Clark.* MASBATE, *Merrill 3077, For. Bur. 12575, 12609, 12663 Rosenbluth.* LEYTE, *For. Bur. 12788 Rosenbluth.* CEBU, *For. Bur. 6453 Everett.* MINDANAO, District of Zamboanga, *For. Bur. 9427, 9483 Whitford & Hutchinson;* Province of Surigao, *For. Bur. 7557 Hutchinson.*

Widely known in the Philippines as *tindalo, balayong,* or *balarong;* other local names are, in Cagayan, *ipil* (erroneously), *balayao, magahao;* in Isabela, *magalayao;* in Camarines, *sangay;* in Surigao, *bayung, bayadgung.*

A widely distributed endemic species and a timber tree of great importance. Mature pods are sometimes 20 cm long and 10 cm wide. It varies greatly in the size of the leaflets, one specimen having them about 12 cm long (*For. Bur. 12788 Rosenbluth*), but the specimen was taken from a sprout, which accounts for the abnormal size. The average size of normal leaflets is about one-half the above. *Puhudia javanica* Miq., is apparently closely allied.

The synonymy and relationship of *Pahudia, Intsia,* and *Sindora* is very fully discussed by Prain in his paper entitled "On the Characters and Relationships of Afzelia (Smith)."[26] In this paper he shows that *Afzelia* Sm. (1798) is congeneric with *Pahudia* Miq. (1855), and has adopted the latter name for the genus. I have followed Prain, for I consider *Afzelia* Sm. (1798) to be invalidated by *Afzelia* J. F. Gmel. (1791), the latter being the oldest valid generic name for *Seymeria* Pursh (*Scrophulariaceae*), in spite of the fact that Pursh's name is included in the list of *nomina conservanda* of the Vienna Botanical Congress.

[26] Sci. Mem. Med. Off. Ind. Army **12** (1901) 1–17, *plate*.

22. BAUHINIA Linn.

Fertile stamens 10.

Leaves more or less cleft, or at least retuse, or of two entirely distinct leaflets.

Leaflets entirely distinct; an erect or subscandent shrub..... 1. *B. binata*

Leaflets connate; erect trees or shrubs.

Flowers small, in many-flowered racemes; calyx with a short tube and a spathaceous, 5-cleft limb; leaves broader than long, glaucous beneath, only slightly cleft § PILIOSTIGMA..... 2. *B. malabarica*

Flowers large, showy; leaves deeply cleft, not glaucous beneath, longer than broad § PAULETIA.

Lobes of the leaves rounded; flowers solitary or in axillary pairs; pods puberulous, not ribbed along the upper suture..... 3. *B. tomentosa*

Lobes of the leaves acute; flowers pure white, racemose; pods glabrous, ribbed along each side of the upper suture..... 4. *B. acuminata*

Leaves entire, acuminate, not at all cleft or divided; pod large, dehiscent, with about two large seeds..... 5. *B. dolichocalyx*

Fertile stamens 3; scandent shrubs § PHANERA.

Leaves entire, acuminate ..... 6. *B. leptopus*

Leaves cleft.

All parts of the flower glabrous except the ovary and style.... 7. *B. subglabra*

Calyx-tubes and lobes pubescent.

Calyx-limb in bud elliptic or ovate, about 5 mm long; tube very slender, short.

Lobes of the leaves strongly divaricate, strongly acuminate, the leaves about 15 cm long..... 8. *B. whitfordii*

Lobes of the leaves somewhat obtusely acuminate, overlapping, the lower surface with scattered, appressed, short hairs, ultimately glabrous or nearly so ..... 9. *B. cumingiana*

Lobes of the leaves rounded, the lower surface densely and softly pubescent, at least on the nerves, with rather long, reddish-brown hairs. 10. *B. nymphaeifolia*

Calyx-limb in bud oblong, 1 to 2 cm long, the tube thickened.

Petals 2.5 cm long or less.

Leaves ample, wider than long, up to 16 cm in width, beneath softly ferruginous-pubescent, especially on the nerves, with long, soft, hairs; lobes broad, rounded; nerves 11..... 11. *B. perkinsae*

Leaves longer than wide, not exceeding 8 cm in length, glabrous or subglabrous.

Petals about 2.5 cm long.

Leaves 9- to 11-nerved..... 12. *B. aherniana*

Leaves 13- to 15-nerved..... 13. *B. antipolana*

Petals 1.2 cm long or less.

Lobes rounded; nerves 9; branches and inflorescence densely pubescent with long ferruginous hairs; racemes dense, the pedicels about 1 cm long..... 14. *B. merrilliana*

Lobes acute; nerves 9 to 11; branches and inflorescence pubescent with short appressed hairs; racemes lax; pedicels 2 cm long. 15. *B. pinchotiana*

Petals 3.5 to 4 cm long..... 16. *B. warburgiana*

Fertile stamen one only § CASPARIA..... 17. *B. monandra*

1. **Bauhinia binata** Blanco Fl. Filip. (1837) 331, ed. 2 (1845) 231, ed. 3, **2**: 66 (err. typ. *binnata*).

Bauhinia pinnata Walp. in Linnaea **16** (1842) Litt.-ber. 53.

Phanera blancoi Benth. Pl. Jungh. (1852) 264; Miq. Fl. Ind. Bat. **1**[1] (1855) 70.

Bauhinia blancoi Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 278; Hemsl. Bot. Challenger Exped. **1**[4] (1884) 146; F.-Vill. Nov. App. (1880) 72; Vid. Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 117, Perk. Frag. Fl. Philip. (1904) 8.

LUZON, Province of Tayabas, *Merrill 1972*. MINDORO, *Cuming 1518*, in Herb. Kew. PALAWAN, *For. Bur. 3545 Curran*. NEGROS, *For. Bur. 13705 Curran*. PANAY, *Copeland s. n.* SIBUTU (Sulu Archipelago), *Merrill 5294*.

Siam (fide Baker); Timor Laut (fide Hemsely).

I can see no valid reason for displacing Blanco's specific name *binata* in favor of *blancoi* although it was misspelled *binnata;* that it was a typographic error for *binata* and not *pinnata,* is shown at once by the phrase immediately following the name," *Bauhinia de hojas hermanadas.*" In placing the species in the key, I have followed Baker, who states that the plant has 10 stamens. None of the specimens before me have flowers, and Blanco does not describe them. Suberect or scandent, confined to the seashore. The only known Philipine species with entirely free leaflets.

2. **Bauhinia malabarica** Roxb. Hort. Beng. (1814) 31, nomen, Fl. Ind. **2** (1832) 321; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 277; F.-Vill. Nov. App. (1880) 72.

Bauhinia acida Reinw. in Flora **31** (1848) 578.

Piliostigma acidum Benth. Pl. Jungh. (1852) 261; A. Gray Bot. Wilkes Explor. Exped. (1854) 470; Naves in Blanco Fl. Filip. ed. 3, *pl. 118*.

Bauhinia tomentosa Blanco Fl. Filip. (1837) 330, ed. 2 (1845) 230, ed. 3, **2**: 65, non Linn.

Bauhinia purpurea Vid. Sinopsis Atlas (1883) *t. 43, fig. A*, non Linn.

LUZON, Province of Bontoc, *For. Bur. 17026 Curran:* Province of Ilocos Norte, *For. Bur. 13938 Merritt & Darling:* Province of Tarlac, *For. Bur. 5148 Curran, Merrill 3618:* Province of Pangasinan, *Merrill s. n.:* Province of Rizal, *For. Bur. 1835 Ahern's collector, Decades Philip. Forest Fl. no. 30 Ahern's collector:* Province of Cavite, *For. Bur. 7617 Rosenbluth:* Province of Laguna, *Wilkes Expedition* in U. S. Nat. Herb., *Elmer, Hallier s. n., For. Bur. 12709 Rosenbluth & Tamesis.*

Most usually known by the name *alibanban,* signifying butterfly, from the shape of the leaves, the name frequently also applied to other species of the genus; in Laguna *calibangbang.* Other names given by Blanco are *livas, balibanban, marulinao, diss, ahihiro, alambihor,* and *alibihil.*

Widely distributed in the Philippines at low altitudes, a characteristic tree of open grass lands; British India to Tenasserim; Java and Timor, but not reported from the Malay Peninsula.

3. **Bauhinia tomentosa** Linn. Sp. Pl. (1753) 375; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 275; F.-Vill. Nov. App. (1880) 72.

Bauhinia binata Naves in Blanco Fl. Filip. ed. 3, *pl. 119*, non Blanco.

LUZON, Manila, *Cuzner 36*, cultivated.

Certainly not a native of the Philippines; India to Ceylon and tropical Africa; probably only cultivated in Malaya.

4. **Bauhinia acuminata** Linn. Sp. Pl. (1753) 375; Baker l. c. 276; F.-Vill. Nov. App. (1880) 72; Perk. Frag. Fl. Philip. (1904) 8; Merr. in Philip. Journ. Sci. **2** (1907) Bot. 433; Naves in Blanco Fl. Filip. ed. 3, *pl. 111.*

LUZON, Manila, *Merrill 4103:* Province of Rizal, *Bur. Sci. 1038 Ramos, Merrill 2689:* Province of Tayabas, *Whitford 855, For. Bur. 7474 Reyes.* MARINDUQUE, collector unknown.

India to Indo-China and southern China, the Malay Peninsula and Archipelago.

Bauhinia grandiflora Blanco Fl. Filip. (1837) 332, ed. 2 (1845) 231, ed. 3, **2:** 67, non Juss., may or may not be referable here. The description applies better than to any other Philippine species known to me, but there are some discrepancies.

5. **Bauhinia dolichocalyx** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 231.

LUZON, Province of Batangas, *For. Bur. 7756 Curran & Merritt.*

Native name: *Malabanot.*

Endemic.

This species was placed by me in the section *Lysiphyllum*, an error on my part, as the entire leaves are quite incompatible with the section. It may be referable to the section *Pauletia.*

6. **Bauhinia leptopus** Perk. Frag. Fl. Philip. (1904) 10.

Bauhinia bidentata F.-Vill. Nov. App. (1880) 72; Vid. Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 117, non Benth.

Phanera bidentata Benth. Pl. Jungh. (1852) 263, pro parte, quoad no. 1744 Cuming.

Bauhinia copelandii Merr. in Philip. Journ. Sci. **3** (1908) Bot. 230.

LUZON, Province of Tayabas, *Warburg 12824* in Herb. Berol. (type). LEYTE, *Cuming 1744.* NEGROS, *For. Bur. 19073 Curran.* MINDANAO, Lake Lanao, *Mrs. Clemens 1059, s. n.:* District of Davao, *Copeland 1429.*

Endemic.

This species is manifestly very closely allied to *Bauhinia bidentata* Jack of the Malay Peninsula and Sumatra, but is readily distinguished by its much shorter calyx-tube. It is also closely allied to *B. pyrrhaneura* Korth. of Sumatra. *B. copelandii* does not appear to be distinct from *B. leptopus* Perk.

7. **B. subglabra** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 230.

PALAWAN, *Bur. Sci. 821 Foxworthy.*

Endemic.

8. **Bauhinia whitfordii** Elmer Leafl. Philip. Bot. **1** (1907) 229.

LUZON, Province of Benguet, *Elmer 8897,* type number: Province of Zambales, *For. Bur. 6009 Curran.*

Native name: *Agpoi* (Zambales).

Endemic.

9. **Bauhinia cumingiana** (Benth.) F.-Vill. Nov. App. (1880) 73; Vidal Rev. Pl. Vasc. Filip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 116; Perk. Frag. Fl. Philip. (1904) 9; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 63.

Phanera cumingiana Benth. Pl. Jungh. (1852) 263; Miq. Fl. Ind. Bat. **1**[1] (1855) 68.

Bauhinia scandens Blanco Fl. Filip. (1837) 332, ed. 2 (1845) 232, ed. 3, **2:** 68, non Linn.

Bauhinia vahlii F.-Vill. Nov. App. (1880) 72, non W. & A.

Phanera vahlii Naves in Blanco Fl. Filip. ed. 3, *pl. 76,* non Benth.

LUZON, Province of Cagayan, *For. Bur. 5256 Klemme, Bolster 193:* Province of Union, *Elmer 5702:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *For. Bur. 9614 Zschokke:* Province of Rizal, *Merrill 2712, Bur. Sci. 6762 Robinson, Decades Philip. Forest Fl. no. 98 Ahern's collector:* Province of Bataan, *For. Bur. 2721 Borden, For. Bur. 187 Barnes, For. Bur. 1442 Ahern's collector, For. Bur. 7227, 7369 Curran, For. Bur. 12938 Alvarez, Williams 563:* Province of Tayabas, *Bur. Sci. 9469 Robinson, For. Bur. 9647 Curran:* Province of Camarines, *Bur. Sci.*

6329 Robinson, For. Bur. 12280 Curran. MASBATE, *For. Bur. 1712 Clark.* PANAY, *Copeland s. n.* CEBU, *Bur. Sci. 1714 McGregor.* NEGROS, *For. Bur. 5234, 5624 Everett, For. Bur. 5232 Aspillera.* MINDANAO, District of Zamboanga, *For. Bur. 9016 Whitford & Hutchinson.*

Native names: *Banot* (Rizal, Bataan); *unpic* (Cagayan); *agqui* (Pampanga); *agpoi* (Bataan); *impid* (Camarines); *calibambang, salibangbangan* (Negros); *balagon* (Zamboanga).

Endemic. The bast fiber of this vine is very strong, and is used by the Negritos of Bataan Province for making bowstrings.

10. **Bauhinia nymphaeifolia** Perk. Frag. Fl. Philip. (1904) 11.

Bauhinia fulva F.-Vill. Nov. App. (1880) 72, non Blume?

LUZON, Province of Ilocos Sur, *Cuming 1180* (type) in Herb. Berol., *1181* in Herb. Kew. & Herb. Bur. Sci.

This species is exceedingly closely allied to *Bauhinia fulva* Blume, (*Phanera fulva* Korth.) of Java, to which, indeed Bentham referred the above number (1181) of Cuming's Philippine plants.[27] It is doubtful if the two are specifically distinct, but I have not sufficient material at hand for comparison to determine the point.

Endemic?

11. **Bauhinia perkinsae** Merr. in Govt. Lab. Publ. **17** (1904) 21.

Bauhinia ferruginea Perk. Frag. Fl. Philip. (1904) 9, non Roxb.

PALAWAN, *Merrill 731, For. Bur. 3552 Curran, Bur. Sci. 822 Foxworthy.* In thickets at low altitudes.

The validity of this species is somewhat doubtful, although it is quite certain that it is not the plant Roxburgh described as *Bauhinia ferruginea.* The original description of *B. ferruginea* is very short, but Prain, who undoubtedly has correctly interpreted Roxburgh's species, gives a full description,[28] which does not apply to the plants here referred to *B. perkinsae.* The type number of the latter, however, agrees very closely with some of the specimens in the Kew Herbarium that are named *B. ferruginea* Roxb.

Endemic.

12. **Bauhinia aherniana** Perk. Frag. Fl. Philip. (1904) 8.

MINDORO, *Merrill 1237, For. Bur. 12007 Merritt, McGregor 256.* CEBU, *For. Bur. 6445 Everett.* MINDANAO, Lake Lanao, *Mrs. Clemens 228, s. n.*

Native names: *Banot* (Mindoro); *banlut* (Cebu).

Endemic.

13. **Bauhinia antipolana** Perk. l. c. 9.

LUZON, Province of Rizal, *Merrill 1317, 1873, For. Bur. 1997 Ahern's collector.*

Native name: *Banot.*

Endemic.

14. **Bauhinia merrilliana** Perk. l. c. 10.

PALAWAN (Paragua), *Merrill 694, For. Bur. 3554 Curran, Bur. Sci. 192 Bermejos.*

In thickets at low altitudes; endemic.

15. **Bauhinia pinchotiana** Perk. l. c. 12.

Bauhinia semibifida Vid. Sinopsis Atlas (1883) *t. 43, fig. 1?;* F.-Vill. Nov. App. (1880) 73, non Roxb.

Phanera semibifida Benth. Pl. Jungh. (1852) 265, pro parte, quoad no. 1119 Cuming.

LUZON, Province of Ilocos Sur, *Cuming 1119* (type number).

Endemic; allied to *B. semibifida* Roxb., but apparently distinct.

[27] Pl. Jungh. (1852) 263.

[28] Journ. As. Soc. Beng. **66** [2] (1907) 184.

16. **Bauhinia warburgii** Perk. l. c. 12.

LUZON, Province of Tayabas, *Warburg 12823* (type) in Herb. Berol.: Province of Camarines, *For. Bur. 11338 Curran.*

Endemic.

17. **Bauhinia monandra** Kurz in Journ. As. Soc. Beng. **42** [2] (1873) 73, Forest Fl. Brit. Burma **1** (1877) 395; Merr. in Philip. Journ. Sci. **4** (1909) Bot. 265; Prain in Journ. As. Soc. Beng. **66** [2] (1897) 505.

Bauhinia richardiana Wall. in Voigt Hort. Suburb. Calcut. (1845) 255, non DC.

Bauhinia krugii Urban Ber. Deutsch. Bot. Ges. **3** (1885) 83.

Bauhinia kappleri Sagot in Ann. Sci. Nat. VI **13** (1882) 317; Perk. Frag. Fl. Philip. (1904) 13.

Bauhinia subrotundifolia F.-Vill. Nov. App. (1880) 72; Naves in Blanco Fl. Filip. ed. 3, *pl. 82*, non Cav.

I have very recently discussed this species and its synonymy [29] citing also the Philippine specimens that represent the species. It is not a native of the Philippines, but its original home is not definitely known, although it was probably derived from tropical America. Prain says that it is not a native of India, but was introduced from Madagascar. It is at once distinguished from all other Philippine species by its single perfect anther. To the synonymy I have added here *B. subrotundifolia* of F.-Villar and of Naves (not of Cavanilles); Naves's plate fairly well represents the species.

DOUBTFUL AND EXCLUDED SPECIES.

BAUHINIA LUNARIA Cav. Icon. **5** (1799) 4, *t. 407;* Vid. Rev. Pl. Vasc. Filip. (1886) 117; F.-Vill. Nov. App. (1880) 72.

The type of this species was collected by Née, the localities given by Cavanilles being "Habitat in Calávan et Acapulco viciniis," the former in the Province of Laguna, Luzon, and the latter in Mexico. The species belongs in the section *Casparia*, which is entirely American (one species now cultivated in the tropics of the world). The species is undoubtedly Mexican, and should be excluded from the Philippine flora.

BAUHINIA SUBROTUNDIFOLIA Cav. l. c. *t. 406;* Vidal l. c.; F.-Vill. l. c.

"Habitat in Calávan duodecim leucis a Manila, et etiam in Acapulco viciniis." Like the preceding, a species of the section *Casparia*, and undoubtedly Mexican, and not Philippine; to be excluded.

BAUHINIA ? LATISILIQUA Cav. l. c., *t. 408*, based on Philippine material, the leaves of a *Bauhinia*, but the fruit of *Mezoneurum*. (=*Mezoneurum latisiliquum* (Cav.) Merr.)

BAUHINIA CASTRATA Blanco Fl. Filip. (1837) 331, reduced in the second edition (1845) to *B. purpurea* Linn., and considered by F.-Villar (Nov. App. (1880) 73), to represent the Linnean species. The identification may be correct, as Blanco's material was from a cultivated specimen. No recent collector has found *B. purpurea* in the Philippines.

BAUHINIA VARIEGATA Linn.; F.-Vill. Nov. App. 73.

BAUHINIA RUFA Grah.; F.-Vill. l. c. 72.

BAUHINIA KHASIANA Baker; F.-Vill. l. c. 73.

BAUHINIA ELONGATA Korth.; F.-Vill. l. c. 73.

BAUHINIA RACEMOSA Lam.; F.-Vill. l. c. 72.

BAUHINIA RETUSA Ham.; F.-Vill. l. c. 72.

[29] Philip. Journ. Sci. **4** (1909) Bot. 265.

The above six species were credited to the Philippines by F.-Villar, probably all being admitted on erroneous identifications. None of the species are known to extend to the Archipelago.

BAUHINIA INERMIS Perr. Mém. Soc. Linn. Paris **3** (1824); C. B. Rob. in Philip. Journ. Sci. **3** (1908) Bot. 304. A *nomen nudum*.

23. CASSIA Linn.

Trees, shrubs, or stout herbs with large leaflets and obtuse sepals.
  Stamens 10, all fertile.
    Lowest 2 or 3 stamens much exceeding the rest; pods cylindric, indehiscent (§ FISTULA).
      Flowers yellow, in elongated, lax racemes; bracts small, deciduous; leaflets up to 14 cm in length ..... 1. *C. fistula*
      Flowers pink and white, in short racemes or corymbs; bracts large, persistent; leaflets 7 cm long or less ..... 2. *C. javanica*
    Stamens equal or subequal; pods flat, dehiscent.
      Peduncles 2- or 3-flowered; pods 7 to 9 mm wide ..... 3. *C. divaricata*
      Peduncles subumbellately or racemosely many-flowered; pods 1.3 to 1.5 cm wide ..... 4. *C. glauca*
  Stamens 10, 7 fertile, the 3 upper ones reduced to staminodes (§ SENNA); pods dehiscent, usually more or less compressed.
    Leaves with glands on the common rachis; suffrutescent herbs.
      Glands between the bases of two opposed leaflets; leaflets obtuse; pods with oblique dissepiments; seeds rhombohedral ..... 5. *C. tora*
      Glands far below the leaflets and near the base of the petiole; leaflets acute; pods with transverse dissepiments; seeds ovate, compresed.
        Most parts of the plant hirsute or pubescent ..... 6. *C. hirsuta*
        All parts of the plant glabrous.
          Leaflets usually more numerous; pods turgid ..... 7. *C. sophera*
          Leaflets 3 to 6 pairs; pods flattened ..... 8. *C. occidentalis*
    Leaves with the rachis channeled above, barred transversely between the leaflets, but without glands.
      Suffrutescent; flowers in strobilate subspicate racemes; pods winged along the valves; leaflets large, reaching 15 cm in length ..... 9. *C. alata*
      Trees or shrubs; flowers in corymbose panicles; pods not winged; leaflets not exceeding 5 cm in length.
        Stipules large, persistent; pod thin-valved, flexible, with narrow sutures; young parts, inflorescence and leaves yellow-pubescent. 10. *C. timoriensis*
        Stipules small, deciduous; pod with coriaceous, rigid valves, sutures thickened; inflorescence somewhat gray-pubescent, leaves glabrous or nearly so ..... 11. *C. siamea*
Slender herbs or undershrubs with very small leaflets and acute sepals (§ CHAMAECRISTA) ..... 12. *C. mimosoides*

1. **Cassia fistula** Linn. Sp. Pl. (1753) 377; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 261; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 156; F.-Vill. Nov. App. (1880) 70; Vid. Sinopsis Altas (1883) *t. 42, fig. E;* Naves in Blanco Fl. Filip. *pl. 120.*

LUZON, Province of Cagayan, *Bur. Sci. 7876 Ramos:* Province of Rizal, *For. Bur. 2991 Ahern's collector:* Province of Laguna, *For. Bur. 10046 Curran.* MINDORO, *For. Bur. 8581 Merritt, For. Bur. 11325 Rosenbluth, Ritchie s. n.*

Native names: *Cañafistula, cañapistola, apostala.* In Mindoro sometimes, but erroneously, called *balayong* and *tindalo* which belong properly to *Pahudia rhomboidea* Prain.

This species is certainly an introduced one in the Philippines, as indicated by its native names, which are of Spanish origin, or corruptions of Spanish names. It is a native of British India, and is now widely distributed in tropical countries in cultivation; Prain expresses the opinion that it is not entitled to be considered an indigenous tree in Malaya.

2. **Cassia javanica** Linn. Sp. Pl. (1753) 379; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 267; Koord. & Valet. Meded. 's Land Plantent. **14** (1895) 8; Vidal Sinopsis Atlas (1883) *t. 42, fig. D;* F.-Vill. Nov. App. (1880) 70.

Cassia fistula Blanco Fl. Filip. (1837) 339, ed. 2 (1845) 237, ed. 3, **2**: 76, saltem pro maxima parte, non Linn.

Cassia nodosa Auct. Philip., non Ham.

LUZON, Province of Isabela, *For. Bur. 11265 Klemme:* Province of Union, *Elmer 5661:* Province of Zambales, *Merrill 2958, Hallier s. n., For. Bur. 5902 Curran, For. Bur. 6020 Aguilar, For. Bur. 13206 Cortes:* Province of Pangasinan, *For. Bur. 13504 Medina, Cuming 1028:* Province of Nueva Ecija, *For. Bur. 14321 Saroca, For. Bur. 8467 Curran:* Province of Batangas, *For. Bur. 7686, 7713 Curran:* Province of Rizal, *For. Bur. 6632, 7030, 10031 Curran:* Province of Tayabas, *Merrill 2057:* Province of Camarines, *For. Bur. 10458 Curran:* Province of Sorsogon, *For. Bur. 5749 Pray.* POLILLO, *Bur. Sci. 9296 Robinson.* MINDORO, *For. Bur. 9688 Merritt.* PALAWAN, *For. Bur. 7440 Manalo, Merrill 809, Bur. Sci. 760 Foxworthy, For. Bur. 15038 Danao, For. Bur. 3856 Curran.* BALABAC, *Bur. Sci. 403 Mangubat.* BURIAS, *For. Bur. 1718 Clark.* LEYTE, *Elmer 7122.* MINDANAO, Lake Lanao, *Mrs. Clemens 613.*

Native names: *Dulaueng* (Isabela); *tualing baculao* (Zambales); *anahuhan* (Tayabas); *malatagum* (Camarines); *baguiroro* (Sorsogon, Burias); *lombayong, ibabao, balayong,* ex Blanco. The names most commonly used, however, are *cañafistula,* and corruptions of it, which properly belong to the preceding species.

Widely distributed in the Philippines at low altitudes; Perak, Sumatra, Java, Timor, Celebes, and Amboina.

Var. **pubifolia** var. nov.

Differt a typo partibus junioribus, subtus foliis, rhachidibusque densissime molliter pubescentibus.

LUZON, Province of Ilocos Sur, *For. Bur. 5239 Klemme:* Province of Rizal, *Merrill 1313, 2639, For. Bur. 1173 Ahern's collector, Decades Philip. Forest Fl. no. 37 Ahern's collector.*

This form, in its extreme development, is quite distinct from the species, and is readily recognizable by its dense soft pubescence, which persists on old leaves; I do not, however, consider it to be specifically distinct, as intergrading forms are represented by *1173 Ahern's collector,* cited here, and *10031 Curran* cited under the species.

What is here interpreted as *Cassia javanica* has been variously identified as *C. javanica L., C. nodosa* Ham., and, by pure error, as *C. fistula.* The latter species is very different, and should not be confused with the present one in any stage. While there is some variation in the numerous specimens here referred to *C. javanica,* I am of the opinion that but a single species is represented. The material agrees well with the very short original description of *C. javanica,* with

Javan material so named in our herbarium, and with the complete description given by Koorders and Valeton. The leaflets vary in shape, and their apices are sometimes rounded and retuse, sometimes acute, and even slightly acuminate. The flowers agree in size with those of *C. javanica*, rather than with those of *C. nodosa*, although the petals appear to be indifferently acute, or rounded, while the inflorescence is sometimes terminal, and sometimes from the older branchlets, in the latter respect approaching *Cassia nodosa* Ham. Whether or not the latter is constantly distinct from *C. javanica* seems to be an open question.

3. **Cassia divaricata** Nees & Blume Syll. Ratisb. 1 (1824) 94; Miq. Fl. Ind. Bat. 1[1] (1855) 97; Benth. in Trans. Linn. Soc. 27 (1871) 554; Vidal Rev. Pl. Vasc. Filip. (1886) 116; Koord. & Valet. Meded. 's Lands Plantent. 14 (1895) 17.

LUZON, Province of Benguet, *Loher 2219, Vidal 1246* in Herb. Kew., *Elmer 5996:* District of Lepanto, *For. Bur. 10928 Curran.*

Java.

4. **Cassia glauca** Lam. Encycl. 1 (1785) 647; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 265; F.-Vill. Nov. App. (1880) 71; Miq. Fl. Ind. Bat. 1[1] (1855) 96; Naves in Blanco Fl. Filip. ed. 3, *pl. 426bis;* Vid. Rev. Pl. Vasc. Filip. (1886) 115.

LUZON, Manila (*Vidal 280, 281*); without locality, *Loher 2218.*

India to southern China and Formosa, south to Malaya, but in many localities perhaps only cultivated.

This species probably has no proper place in the Philippine flora, as Vidal's specimens were from Manila, doubtless from cultivated trees, while F.-Villar's reference is based on trees cultivated in the old botanic garden, where they no longer exist. Loher's specimen may also have been from cultivated plants, but the distributed material of his collection is not localized. The much earlier *Cassia surattensis* Burm. Fl. Ind. (1768) 97, is referred here by Bentham, but I have not been able to verify it.

5. **Cassia tora** Linn. Sp. Pl. (1753) 376; Blanco Fl. Filip. (1837) 337, ed. 2 (1845) 235; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 263; F.-Vill. Nov. App. (1880) 70; Naves in Blanco Fl. Filip. ed. 3, *pl. 122;* Benth. Trans. Linn. Soc. 27 (1871) 535.

BATANES ISLANDS, *Bur. Sci. 3641 Fénix.* LUZON, Province of Cagayan, *Bur. Sci. 7873 Ramos:* Province of Pangasinan, *Bur. Sci. 4859 Ramos:* Province of Pampanga, *Parker 34:* Manila, *Merrill 82, McGregor 49:* Province of Rizal, *For. Bur. 3357 Ahern's collector:* Province of Bataan, *Williams 126, For. Bur. 1944 Borden, Merrill 3170.* MINDORO, *For. Bur. 5519 Merritt.* CEBU, *Barrow 18.* MINDANAO, District of Davao, *DeVore & Hoover 178:* Lake Lanao, *Mrs. Clemens s. n.*

Widely distributed in the Philippines, and exceedingly abundant about towns and settlements; tropics of the World.

Native names: *Andadasi* (Ilocano); *balatong aso* (Rizal, Batangas); *manimanihan, mongomongohan, catandang aso,* ex Blanco.

By some authors *Cassia obtusifolia* Linn. is held distinct from *C. tora.* The gland characters appear to be the most valid ones for distinguishing the two, *Cassia tora* supposedly having a gland between each of the two lower pairs of leaflets, and *C. obtusifolia* having a gland between the lowermost pair of leaflets only. Both are represented in the material cited above; there are also some specimens that on at least some of their leaves show no glands at all. In connection with this matter a great number of living specimens were examined, and the occurrence of leaves without glands was found to be frequent.

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6. **Cassia hirsuta** Linn. Sp. Pl. (1753) 378; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 263; F.-Vill. Nov. App. (1880) 70.

Cassia longisiliqua Blanco Fl. Filip. (1837) 338, non Linn.

Cassia sulcata Blanco l. c. ed. 2 (1845) 236, non DC.

LUZON, Province of Rizal, *Bur. Sci. 6525 Robinson, For. Bur. 1978, 3428 Ahern's collector:* Manila, *Merrill 4099.*

Native names: *Balbalatungan* (Manila); *tighiman,* ex Blanco.

A native of tropical America, now widely distributed in the tropics of the world. The Philippine specimens cited above have much shorter hairs than Indian and Malayan material in our herbarium, so named, and the peduncles are mostly more than two-flowered.

7. **Cassia sophera** Linn. Sp. Pl. (1753) 379; Baker l. c. 262; F.-Vill. Nov. App. (1880) 70; Vidal Rev. Pl. Vasc. Filip. (1886) 116.

LUZON, Province of Union, *Elmer 5604:* Province of Laguna, *Elmer:* Province of Ilocos Norte, *For. Bur. 13802 Merritt & Darling.*

Originally an American weed, now cosmopolitan in the tropics; similar to and closely allied to the next, which, however, is much more common and widely distributed in the Philippines.

8. **Cassia occidentalis** Linn. Sp. Pl. (1753) 377; Baker l. c. 262; Blanco Fl. Filip. (1837) 338, ed. 2 (1845) 236; F.-Vill. l. c.; Naves in Blanco Fl. Filip. ed. 3, *pl. 73.*

LUZON, Province of Cagayan, *For. Bur. 16482 Bacani:* Province of Isabela, *Bur. Sci. 8101 Ramos:* Province of Ilocos Sur, *For. Bur. 14015 Merritt & Darling:* Province of Bataan, *For. Bur. 1943 Borden:* Manila, *Elmer 5516, McGregor 48, Topping 3, Merrill 391:* Province of Tayabas, *Whitford 541:* Province of Albay, *Bur. Sci. 6304 Robinson.* POLILLO, *Bur. Sci. 9169 Robinson.* MINDORO, *For. Bur. 5496 Merritt, Merrill 3339.* TABLAS, *McGregor 340.* PANAY, *Yoder 27.* MINDANAO, Province of Surigao, *Allen 143:* Lake Lanao, *Mrs. Clemens 472:* District of Davao, *DeVore & Hoover 150.*

Native names: *cabalcabalan, tambalisa* (Mindoro); *tighiman,* ex Blanco.

A weed in waste places at low altitudes throughout the Philippines; probably originally American, but now cosmopolitan in the tropics.

9. **Cassia alata** Linn. Sp. Pl. (1753) 378; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 264; F.-Vill. Nov. App. (1880) 70; Blanco Fl. Filip. (1837) 339, ed. 2 (1845) 237, ed. 3, **2:** 77; Naves l. c. ed. 3, *pl. 124bis.*

Herpetica alata Raf. Sylva Tellur. (1838) 123; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. **9** (1905) 293.

LUZON, Province of Abra, *For. Bur. 14565 Darling:* Province of Union, *Elmer 5597:* Manila, *Topping 4, Merrill 3427:* Province of Rizal, *For. Bur. 3427 Ahern's collector:* Province of Bataan, *Williams 318, For. Bur. 2198, 2583 Meyer, Elmer 7015:* Province of Tayabas, *Ritchie 76:* Province of Albay, *Bur. Sci. 6245 Robinson.* MINDORO, *Merrill 1256.* BUSUANGA, *Merrill 434.* BALABAC, *Bur. Sci. 475 Mangubat.* PANAY, *Copeland s. n.* NEGROS, *For. Bur. 4204 Everett.* CEBU, *Bur. Sci. 1743 McGregor.* MINDANAO, District of Zamboanga, *For. Bur. 9202 Whitford & Hutchinson:* Province of Surigao, *Bolster 202:* Lake Lanao, *Mrs. Clemens s. n.* BASILAN, *For. Bur. 3957 Hutchinson.*

Native names: *Acapulco, capurco* (Manila, Zamboanga); *palochina* (Busuanga, Negros); *bicas-bicas* (Marinduque); *bayabasan* (Tayabas); *sunting* (Surigao); *pacagoncon* (Bataan); *andadasi, adadasi* (Union, Abra); *sonting, catanda, casitas, gamot sa buni, pacayomcom castila,* ex Blanco.

Widely distributed in the Philippines in waste places about settlements, etc., and undoubtedly of American origin; now cosmopolitan in the tropics of the world.

10. **Cassia timoriensis** DC. Prodr. **2** (1825) 499; Miq. Fl. Ind. Bat. 1 [1] (1855) 99; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 265; F.-Vill. Nov. App. (1880) 71; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 63.

Cassia arayatensis Llanos Frag. (1851) 71; Blanco Fl. Filip. ed. 3, 4 [1] (1880) 55.

Cassia montana Naves in Blanco Fl. Filip. ed. 3, *pl. 452,* non Heyne.

LUZON, Province of Ilocos Sur, *Fur. Bur. 5660 Klemme:* Province of Pangasinan, *For. Bur. 14199 Merritt, For. Bur. 8342 Curran & Merritt:* Province of Tarlac, *Merrill 3639:* Province of Nueva Ecija, *For. Bur. 8472, 8423 Curran:* Province of Pampanga, *Merrill 1400:* Province of Rizal, *For. Bur. 2292 Ahern's collector, Decades Philip. Forest Fl. no. 261 Ahern's collector:* Province of Bataan, *Williams 390, Merrill 1494, For. Bur. 2339 Borden, For. Bur. 2238 Meyer, For. Bur. 361 Barnes.*

Native names: *Bagauac, balacbac* (Bataan); *bayacbac* (Pampanga); *malacaturay, malapatpat* (Nueva Ecija); *isar* (Ilocos Sur).

In thickets at low altitudes; India to Indo-China, the Malay Peninsula and Archipelago.

The Philippine material is apparently all referable to var. *xanthocoma* Miq. Fl. Ind. Bat. 1 [1] (1855) 99 (*Cassia xanthocoma* Miq. Analecta **1** (1850) 10), which is apparently not specifically distinct from *C. timoriensis* DC.

11. **Cassia siamea** Lam. Encycl. **1** (1785) 648; Benth. Trans. Linn. Soc. **27** (1871) 549; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 264; F.-Vill. Nov. App. (1880) 71.

Cassia florida Vahl Symb. **3** (1794) 57; Miq. Fl. Ind. Bat. 1 [1] (1855) 98.

Cassia arayatensis Naves in Blanco Fl. Filip. ed. 3, *pl. 426,* non Llanos.

LUZON, Manila, *Ahern 711, For. Bur. 12475, 19024 Curran:* Province of Rizal, Morong, *Bur. Sci. 1365 Ramos.*

Introduced and cultivated only, now extensively used as a shade tree in Manila; India to Indo-China, the Malay Peninsula and Archipelago; widely distributed in the tropics in cultivation.

12. **Cassia mimosoides** Linn. Sp. Pl. (1753) 379; Miq. Fl. Ind. Bat. 1 [1] (1855) 101; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 266; Blanco Fl. Filip. (1837) 340, ed. 2 (1845) 237, ed. 3, **2:** 78; F.-Vill. Nov. App. (1880) 71.

LUZON, Province of Cagayan, *Bur. Sci. 7814 Ramos:* Province of Benguet, *For. Bur. 15946 Bacani, Williams 994, 995, Bur. Sci. 3509 Mearns:* Province of Rizal, *Bur. Sci. 1045, 1488, 1835, 1843 Ramos.* MINDORO, *For. Bur. 9754 Merritt.* NEGROS, *For. Bur. 13715 Curran.* MINDANAO, Lake Lanao, *Mrs. Clemens 4:* District of Davao, *Copeland 1304.*

Widely distributed in the Philippines at medium and higher altitudes; India and southern China through Malaya to New South Wales.

EXCLUDED SPECIES.

CASSIA MONTANA Heyne; F.-Vill. Nov. App. (1880) 71. Probably admitted on an erroneous identification; the species is unknown from the Philippines.

24. GLEDITSIA Linn.

1. **Gleditsia rolfei** Vid. Rev. Pl. Vasc. Filip. (1886) 115; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 63.

Gleditsia celebica Koord. Meded. 's Lands Plantent. **19** (1898) 433; Merr. Forest. Bureau (Philip.) Bull. **1** (1903) 24.

LUZON, Province of Pampanga, Mount Arayat, *Merrill 5026:* Province of Bataan, *For. Bur. 326 Barnes, Williams 564, For. Bur. 7345, 17320 Curran:* Province of

Nueva Ecija, *Vidal 1826* in Herb. Kew. (type): Province of Batangas, *Copeland s. n.:* Province of Tayabas, *For. Bur. 10335 Curran:* Province of Camarines, *Ahern 62.* CELEBES, *Koorders*, cultivated in the Botanical Garden, Buitenzorg, Java.

Native name (Tayabas), *Tahid-labuyo*, meaning cock's spur, from the spines.

A species allied to those of southern China; known only from Luzon and Celebes.

A second species is apparently represented by sterile material collected in Cebu by Espinosa, *For. Bur. 6488*, locally known as *Matagum*. It differs from *G. rolfei* in having entire leaflets which are prominently and inequilaterally retuse at the apex.

The generic name is in honor of Gleditsch, latinized and simplified *Gleditsia;* Taubert prefers the spelling *Gleditschia.*

25. **PTEROLOBIUM** R. Br.

1. **Pterolobium membranulaceum** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 22.

Mimosa membranulacea Blanco Fl. Filip. (1837) 739.

Reichardia pentapetala Blanco l. c. ed. 2 (1845) 233, ed. 3, **2**: 71.

Pterolobium indicum F.-Vill. Nov. App. (1880) 70; Vidal Sinopsis Atlas (1883) *t. 42, fig. G,* Rev. Pl. Vasc. Filip. (1886) 114, non A. Rich.

LUZON, Province of Rizal, *For. Bur. 1837, 1984 Ahern's collector:* Province of Bataan, *Vidal 1285:* Province of Union, *Vidal 1299,* in Herb. Kew.: without locality, *Loher 2183, 2188, 2189,* in Herb. Kew.

Endemic.

Blanco's description is imperfect, and in some respects does not apply especially well to the specimens here referred to it; I am confident, however, that the identification is correct.

26. **DELONIX** Raf.

1. **Delonix regia** (Boj.) Raf. Fl. Tellur. **2** (1836) 92; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. **9** (1905) 256.

Poinciana regia Boj. ex Hook. Bot. Mag. **56** (1829) *t. 2884;* F.-Vill. Nov. App. (1880) 70; Naves in Blanco Fl. Filip. ed. 3, *pl. 451.*

LUZON, Province of Union, *Elmer 5656:* Manila, *For. Bur. 19026 Curran, Cordova 482:* Province of Pampanga, *Parker.* PALAWAN, *For. Bur. 3561 Curran.* BASILAN, *For. Bur. 3466 Hutchinson.*

Native names: *Arbol del fuego; caballero.* The "fire tree" or "flamboyant."

A native of Madagascar, now widely distributed in the tropics of the world in cultivation; commonly cultivated in towns in the Philippines.

Following strict rules, the proper generic name for this well-known and widely distributed species is *Delonix* Raf., as the genus *Poinciana* Linn. was based solely on what is now generally known as *Caesalpinia pulcherrima* (L.) Sw. The genus *Poinciana* has page preference over *Caesalpinia*, and hence by strict interpretation of the rules of nomenclature, those species now referred to *Caesalpinia,* generic limits retained as defined by Bentham & Hooker, should be treated as *Poinciana,* the genus *Caesalpinia* falling into synonymy. This extreme interpretation has been followed by some recent botanists, but at the same time they have raised some of the sections of *Caesalpinia,* as interpreted by Bentham & Hooker, and by Taubert, to generic rank. It seems doubtful to me if any representative botanical congress will sanction the transfer of *Caesalpinia* bodily to *Poinciana,*

on account of the confusion in nomenclature that such a course of procedure will entail. *Delonix* is here adopted for the present genus, as under no rules at present in force can *Poinciana* be retained for it.

27. CAESALPINIA Linn.

Pods armed with abundant wiry prickles; petals narrow; scandent spiny shrubs (§ GUILANDINA).

Leaves with large foliaceous stipules; leaflets mostly less than 2.5 cm in length; pods 5 to 7 cm long ..... 1. *C. crista*

Leaves without stipules; leaflets 3 to 5 cm long; pods about 10 cm long. 2. *C. glabra*

Pods unarmed; petals broad.

Leaflets coriaceous, few, 2 or 3 pairs on each pinna, 2 to 6 cm long, acute; pods short, the seeds solitary, rarely 2 (§ NUGARIA) ..... 3. *C. nuga*

Leaflets membranaceous or subcoriaceous, many, 8 or more pairs on each pinna, mostly less than 2 cm long, rounded; pods with from 5 to 8 seeds.

Petals distinctly clawed; stamens long-exserted, several times as long as the petals; pods about 2 cm wide (§ CAESALPINARIA) ..... 4. *C. pulcherrima*

Petals not or but slightly clawed; stamens short, not or but slightly exserted (§ SAPPANIA).

An erect tree; stipules none; pods 3 to 4 cm wide; with a stout spreading beak at the upper angle of the obtuse apex ..... 5. *C. sappan*

Scandent spiny shrubs; pods oblong or linear-oblong, less than 3 cm in width; stipules present, deciduous ..... 6. *C. sepiaria*

1. **Caesalpinia crista** Linn. Sp. Pl. (1753) 380, (excl. syn. Fl. Zeyl. 157, pro parte, Herm. zeyl. 12), non ed. 2 (1762) 544, nec aliorum; Urban Symb. Antill. 2 (1900) 269.

Guilandina bonduc Linn. l. c. 381, non ed. 2 (1762) 545.

Guilandina bonducella Linn. l. c. ed. 2 (1762) 545; Blanco Fl. Filip. (1837) 343, ed. 2 (1845) 239, ed. 3, **2**: 81.

Caesalpinia bonducella Flem. As. Res. **11** (1810) 159; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 254; F.-Vill. Nov. App. (1880) 69; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 226.

Guilandina crista Small Fl. Southeast. U. S. (1903) 591; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. **9** (1905) 288.

LUZON, Province of Union, *Elmer 5723, Fénix 11:* Province of Pangasinan, *Bur. Sci. 4969 Ramos:* Province of Bataan, *Williams 332, Elmer 7002, Merrill 3284.* MINDORO, *For. Bur. 5535 Merritt.* CEBU, *Barrow 8.* MINDANAO, District of Davao, *DeVore & Hoover 155, Copeland 345.*

Native names: *Calambibit* (widely used); *dauer* (Union); *bangbang* (Cebu); *dalagdag* (Mindoro); *dalugdug* ex Blanco.

Widely distributed in the Philippines near the seashore; cosmopolitan in the tropics of the world.

The synonymy of this species is rather complicated, but it has been cleared up by Urban.[30] The first citation given by Linnaeus is to his Flora Zeylanica no. 157, but this is only in part (*Pluk. alm. 4. t. 2. f. 2*) referable to the present species, the reference to *Herm. zeyl. 12* being an error, for Trimen [31] calls attention to the fact that the specimen in Hermann's Herbarium is *Caesalpinia nuga* (L.) Ait., and not *C. crista*. *Guilandina bonduc* and *G. bonducella* Linn., as cited above, are certainly identical with *C. crista* Linn.

[30] Symb. Antill. **2** (1900) 269–271.

[31] Fl. Ceyl. **2** (1894) 99.

2. **Caesalpinia glabra** (Mill.) comb. nov.

Guilandina glabra Mill. Gard. Dict. ed. 8 (1768) no. 3.

Caesalpinia bonduc Roxb. Hort. Beng. (1814) 32, Fl. Ind. **2** (1832) 362; Baker in Fl. Brit. Ind. **2** (1878) 255; F.-Vill. Nov. App. (1880) 69; Urban Symb. Antill. **2** (1900) 272, non *Guilandina bonduc* Linn. Sp. Pl. (1753) 381.

Guilandina bonduc Linn. Sp. Pl. ed. 2 (1762) 545, pro parte, non ed. 1 (1753) 381.

Caesalpinia crista Perk. Frag. Fl. Philip. (1904) 15, non Linn.

Guilandina bonduc var. *majus* DC. Prodr. **2** (1825) 480.

Guilandina major Small Fl. Southeast. U. S. (1903) 591.

PALAWAN, *Merrill 842, Bur. Sci. 228 Bermejos.* MINDANAO, Lake Lanao, *Mrs. Clemens 755, 863, 1182:* District of Davao, *Copeland s. n.* One of the specimens from Lake Lanao (*Clemens 863*) has comparatively few and weak spines on the pod, but I do not consider it specifically distinct from the more common form with stout spines.

Cosmopolitan in the tropics.

I consider the specific name *bonduc* to be invalid in the genus, as the species as originally described under *Guilandina* is a synonym of *C. crista* Linn. What is apparently the earliest valid name is here adopted.

3. **Caesalpinia nuga** (Linn.) Ait. Hort. Kew. ed. 2, **3** (1811) 32; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 255; F.-Vill. Nov. App. (1880) 69; Naves in Blanco Fl. Filip. ed. 3, *pl. 150.*

Guilandina nuga Linn. Sp. Pl. ed. 2 (1762) 546; Blanco Fl. Filip. (1837) 344, ed. 2 (1845) 240, ed. 3, **2:** 81.

Caesalpinia laevigata Perr. Mém. Linn. Soc. Paris **3** (1824) 104.

LUZON, Province of Cagayan, *Bur. Sci. 7418 Ramos:* Province of Pangasinan, *Bur. Sci. 4879 Ramos:* Province of Zambales, *Hallier, s. n., For. Bur. 5909 Curran:* Province of Bulacan, *McGregor 96:* Manila, *Marave 68:* Province of Bataan, *For. Bur. 2272 Meyer, For. Bur. 1952, 2492 Borden, Elmer 7009, Whitford 1264:* Province of Tayabas, *Whitford 842,* in part: Province of Camarines, *Ahern 252.* POLILLO, *Bur. Sci. 9139 Robinson.* LUBANG, *Merrill 962.* MINDORO, *Merrill 1294, 1225, 3341, For. Bur. 5517 Merritt.* PALAWAN, *Bur. Sci. 610 Foxworthy.* PANAY, *Copeland 108.* NEGROS, *For. Bur. 7330 Everett.* MINDANAO, Province of Surigao, *Bolster 367:* District of Davao, *Williams 2740.*

Native names: *Sapnit, sapinit,* or *sagmit,* in most provinces; sometimes *camat-cabag;* in Mindoro sometimes *calauinit; bacaig* (Polillo).

Widely distributed in the Philippines along the seashore; throughout the tropics of the world in littoral districts.

4. **Caesalpinia pulcherrima** (Linn.) Sw. Obs. (1791) 166; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 255; F.-Vill. Nov. App. (1880) 69; Naves in Blanco Fl. Filip. ed. 3, *pl. 112.*

Poinciana pulcherrima Linn. Sp. Pl. (1753) 380; Blanco Fl. Filip. (1837) 333, ed. 2 (1845) 232, ed. 3, **2:** 69; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. **9** (1905) 358.

Amost universally known in the Philippines by the Spanish name *"caballero,"* rarely as *"maravilla;"* according to Blanco sometimes *"flores"* or *"rosas,"* all names of Spanish origin. Undoubtedly originating in tropical America; now widely distributed in the tropics of the world. It is extensively cultivated, and also spontaneous in the Philippines, and is represented by numerous specimens from all parts of the Archipelago, from the Batanes Islands to Palawan and southern Mindanao.

This species is the type of the genus *Poinciana* Linn., and is the only one cited by him under this genus in the first edition of his "Species Plantarum." According to strict priority *Poinciana* would be the proper generic name for the species now placed in *Caesalpinia*. See page 52.

5. **Caesalpinia sappan** Linn. Sp. Pl. (1753) 381; Blanco Fl. Filip. (1837) 335, ed. 2 (1845) 234, ed. 3, **2**: 72; Naves l. c. ed. 3, *pl. 121;* Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 255; F.-Vill. Nov. App. (1880) 69; Vid. Sinopsis Atlas (1883) *t. 42, fig. C.*

Biancaea sappan Todaro Hort. Bot. Panorm. (1876) 3; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. **9** (1905) 198.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2292 Mearns:* Province of Ilocos Sur, *For. Bur. 14073 Merritt & Darling:* Province of Union, *Elmer 5547:* Province of Zambales, *Merrill 2959:* Province of Bulacan, *Bur. Sci. 6127 Robinson & Merritt:* Province of Rizal, *For. Bur. 3286 Ahern's collector:* Province of Bataan, *For. Bur. 13376 Cortes, For. Bur. 5984 Curran, Ahern 771:* Province of Tayabas, *Merrill 2420, 2131.* MINDORO, *Merrill 887, For. Bur. 9822 Merritt.* GUIMARAS, *For. Bur. 48 Ritchie, For. Bur. 4541 Villar.* NEGROS, *For. Bur. 5577 Everett.* BANTAYAN, *Bur. Sci. 1699 McGregor.* MINDANAO, *Mrs. Clemens 1177.*

Universally known in the Philippines as *sappan* or *sappang*, and *sibucao*.

India to Indo-China, the Malay Peninsula and Archipelago; probably not a true native of the Philippines, but introduced in ancient times.

6. **Caesalpinia sepiaria** Roxb. Hort. Beng. (1814) 32, nomen, Fl. Ind. **2** (1832) 360; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 256; F.-Vill. Nov. App. (1880) 69; Vidal Rev. Pl. Vasc. Filip. (1886) 114; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 229; Urban Symb. Antill. **2** (1900) 277.

Caesalpinia benguetensis Elmer Leafl. Philip. Bot. **1** (1907) 226.

Mezoneurum benguetense Elmer l. c. (1908) 362.

LUZON, Province of Rizal, (*Vidal 268*); without locality, *Loher 2194, 2195* in Herb. Kew.: Province of Benguet, *Elmer 5888, 8720* (type number of *C. benguetensis*), *Williams 1206:* Province of Isabela, *Bur. Sci. 8094 Ramos.*

I am unable to distinguish *Caesalpinia benguetensis* Elm. from the widely distributed *C. sepiaria* Roxb. Mr. Elmer states that his species is distinguished by its smaller leaves, obsolete stipules, and pods not beaked; the former character is exceedingly variable, while my specimen of the type number has a single pod bearing a 5 mm long beak, and the stipules, although smaller than in typical *Caesalpinia sepiaria*, and early deciduous, are present. The stipules on *Elmer 5888* are very distinct. The transfer to *Mezoneurum* was primarily due to a suggestion made by myself, and apparently without additional study on the part of Mr. Elmer.

It correctly reduced, *Reichardia ? decapetala* Roth Nov. Pl. Sp. (1821) 212; DC. Prodr. **2** (1825) 484, supplies the earliest specific name for the species, as Roxburgh's original reference to *Caesalpinia sepiaria* is a *nomen nudum*.

India to southern China and Japan, south to Malaya; introduced in tropical America, Australia, and Africa.

EXCLUDED SPECIES.

CAESALPINIA MIMOSOIDES Lam.; F.-Vill. Nov. App. (1880) 69. A species of India and Ceylon, not known from the Philippines, and doubtless admitted by F.-Villar on an erroneous identification.

28. MEZONEURUM Desf.

Calyx deeply cleft, with a wide short tube and a basal disk, the anterior lobe deeply cucullate (§ EUMEZONEURUM).

Leaflets opposite, large, ovate, acute or acuminate, about 10 cm long. 1. *M. cucullatum*

Leaflets alternate or subopposite, small, elliptic to elliptic-oblong, broad and rounded at the apex, 1.5 to 3.5 cm long.

Leaflets beneath and calyx externally rather densely pubescent. 2. *M. pubescens*

Leaflets and calyx glabrous.

Leaflets about 1.5 cm long; pods 1-seeded..... 3. *M. mindorense*

Leaflets 2.5 to 3.5 cm long; pods 5- to 7-seeded..... 4. *M. latisiliquum*

Calyx shallowly cleft, with a narrow, elongated tube, the disk extending above the base, the anterior lobe shallowly hooded. (Leaflets alternate, obovate-oblong, obtuse, 5 to 7 cm long) (§ TUBICALYX)..... 5. *M. sumatranum*

1. **Mezoneurum cucullatum** (Roxb.) Wight & Arn. Prodr. (1834) 283; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 258; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 232.

Caesalpinia cucullata Roxb. Hort. Beng. (1814) 32, Fl. Ind. **2** (1832) 358.

Mezoneurum macrophyllum Bl. ex Miq. Fl. Ind. Bat. **1**[1] (1855) 104.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 922*, February, 1907.

India to Yunnan (*Henry 12215*), south to Cochin-China, the Andaman Islands and Java; not previously reported from the Philippines.

Mezoneurum macrophyllum Bl., was reduced to *M. cucullatum* W. & A. by Baker, and the description of Blume's species seems to apply rather closely to the latter.

2. **Mezoneurum pubescens** Desf. in Mém. Mus. Paris **4** (1818) 245, *t. 11*; F.-Vill. Nov. App. (1880) 70; Vidal Rev. Pl. Vasc. Filip. (1886) 114.

Caesalpinia ignota Blanco Fl. Filip. (1837) 336, ed. 2 (1845) 235, ed. 3, **2**: 72.

Mezoneurum hymenocarpum W. & A. Prodr. **1** (1834) 283; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 233, 472 ?

LUZON, Province of Rizal, *For. Bur. 1477, 3370 Ahern's collector, Dec. Philip. Forest Fl. no. 206 Ahern's collector;* near Manila, *Marave 69, McGregor 79, Llana 229, Merrill.*

Native names: *Camat-cabag, dauag* (Rizal).

Timor.

There is some doubt as to the additional range of this species, as Baker records it from Burma, but Prain states that the Burman, Ceylon, and Andaman Island material is *Mezoneurum hymenocarpum* W. & A., which species has alternate leaflets, much fewer in number than those of *M. pubescens* Desf. Fragments of three of the above numbers, representing flowers, immature and mature pods, were sent to the Paris Museum for comparison with Desfontaines' type. Doctor Lecomte, who kindly made the comparison, writes as follows: "Il résulte de cette étude que l'un des échantillons envoyés correspond aussi bien que possible à *M. hymenocarpum* W. et A., et l'autre à *M. pubescens* Desf., type. I, *M. hymenocarpum* W. & A., *coll. Llana 229*, 2, *M. pubescens* Desf., *coll. Ramos 1477*, *Marave 69*. De la première espèce nous possedons un échantillon envoyé par King absolument semblable à celui qui vous nous avez communiqué. De la deuxième nous avons pu faire la comparaison avec le type." After a careful examination of a full series of specimens, however, I am convinced that but a single species is represented by the material cited above. The specimen collected by Llana, examined by Doctor Lecomte, has very thin, immature fruit, but in all

other respects the plant agrees with the others cited above. The species is common in thin poor soil over volcanic tuff on open hills near Manila.

3. **Mezoneurum mindorense** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 232.

MINDORO, *For. Bur. 5383 Merritt.*

Native name: *Sapinit.*

Var. **inerme** Merr. l. c.

MINDORO, *Bur. Sci. 1514 Bermejos.*

Endemic.

4. **Mezoneurum latisiliquum** (Cav.) Merr. in Philip. Journ. Sci. 4 (1909) Bot. 268.

Bauhinia ? latisiliqua Cav. Icon. 5 (1799) 5, *t. 408*, in part, excl. description and figure of the leaves.

Mezoneurum glabrum Desf. in Mém. Mus. Paris 4 (1818) 245, *t. 10;* DC. Prodr. 2 (1825) 484; F.-Vill. Nov. App. (1880) 70; Miq. Fl. Ind. Bat. 1^1 (1855) 103; Vidal Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 114; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64.

Caesalpinia torquata Blanco Fl. Filip. (1837) 336.

Mezoneurum procumbens Blanco l. c. ed. 2 (1845) 235, ed. 3, 2: 73.

Represented by numerous specimen cited by myself, *l. c.*, with the addition of *Bur. Sci. 7737 Ramos*, Province of Ilocos Norte, Luzon.

Native names: *Camut-pusa*, literally "cat's claw," (Pampanga, Mindoro, Bataan, Rizal); *sampinit* (Mindoro, Basilan); *sokit* (Basilan); *sagnit, sapnit, cabitcabag, tugabang, ugabang*, ex Blanco.

At low altitudes, northern Luzon to southern Mindanao; Timor.

The *Mezoneurum glabrum* of Baker in the Flora of British India is not Desfontaines' species, but is *M. furfuraceum* Prain.

5. **Mezoneurum sumatranum** (Roxb.) Wight & Arn. Prodr. 1 (1834) 283; Miq. Fl. Ind. Bat. 1^1 (1855) 105, 1081; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 259; Prain ex King in Journ. As. Soc. Beng. 66^2 (1897) 235.

Caesalpinia sumatrana Roxb. Hort. Beng. (1814) 32, nomen, Fl. Ind. 2 (1832) 366.

Mezoneurum rubrum Merr. in Govt. Lab. Publ. (Philip.) 6 (1904) 7.

PALAWAN, *Merrill 805.*

The above specimen, on which *Mezoneurum rubrum* was based, is in fruit, and was referred by Perkins[32] to *M. glabrum* Desf. (=*M. latisiliquum* (Cav.) Merr.). Comparison with authentic material of *M. sumatranum* shows it to be the same as that species, and it is here accordingly reduced.

Malacca, Perak, Singapore, and Sumatra.

29. PELTOPHORUM Vogel.

1. **Peltophorum inerme** (Roxb.) Naves in Blanco Fl. Filip. ed. 3, *pl. 335*, ex F.-Vill. Nov. App. (1880) 69, as syn.

Caesalpinia inermis Roxb. Hort. Beng. (1814) 90, Fl. Ind. 2 (1832) 367.

Poinciana roxburghii G. Don Gen. Syst. 2 (1832) 433.

Caesalpinia ferruginea Decne. Nouv. Ann. Mus. 3 (1834) 462.

Caesalpinia arborea Zoll. Nat. en Geneesk. Archief 3 (1846) 65; Miq. Fl. Ind. Bat. 1^1 (1855) 112.

Peltophorum ferrugineum Benth. Fl. Austral. 2 (1864) 279; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 257; F.-Vill. Nov. App. (1880) 69; Vidal Rev. Pl. Vasc. Filip. (1886) 114; Prain ex King in Journ. As. Soc. Beng 66^2 (1897) 224.

[32] Frag. Fl. Philip. (1904) 15.

Baryxylum inerme Pierre Fl. Forest. Cochinch. (1899) *t. 390.*

LUZON, Province of Pangasinan, *For. Bur. 8307 Curran & Merritt:* Province of Batangas, *For. Bur. 7739 Curran & Merritt:* Manila, *Merrill 4087, For. Bur. 19053, 19054 Curran,* cultivated. MINDORO, *For. Bur. 9735, 9823 Merritt.* PALAWAN, *For. Bur. 3498 Curran, For. Bur. 7427 Manalo.* BALABAC, *Bur. Sci. 484 Mangubat.*

A tree of low altitudes, mostly confined to the seashore; extensively cultivated in Manila as a shade tree. Malay Peninsula and the Andaman Islands to Borneo, Java, Timor, and northern Australia.

The oldest specific name is here adopted, and the generic designation *Peltophorum* is retained in accordance with the action of the Vienna Botanical Congress, although *Baryxylum* Lour. is much older.

30. **ORMOSIA** Jacks.

Flowers about 2 cm long, whitish; leaves softly pubescent, the nerves very distinct ..... 1. *O. paniculata*
Flowers about 1 cm long, purplish; leaves glabrous, shining, the nerves obscure ..... 2. *O. calavensis*

1. **Ormosia paniculata** Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 21, Philip. Journ. Sci. **1** (1906) Suppl. 64.

LUZON, Province of Bataan, *For. Bur. 2028* Borden, October, 1904.

Endemic.

2. **Ormosia calavensis** Azaola ex Blanco Fl. Filip. ed. 2 (1845) 230, ed. 3, **2**: 64; F.-Vill. Nov. App. (1880) 69; Vidal Rev. Pl. Vasc. Filip. (1886) 113, Phan. Cuming. Philip. (1885) 109, Sinopsis Atlas (1883) *t. 41, fig. H;* Perk. Frag. Fl. Philip. (1904) 15; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 64; Prain in Journ. As. Soc. Beng. **69**[2] (1900) 180.

LUZON, Province of Cagayan, *For. Bur. 16985 Bacani:* Province of Ilocos Norte, (*Cuming 1219*): Province of Rizal, *Merrill 1724, 2661, For. Bur. 447, 2963 Ahern's collector, Bur. Sci. 3362 Ramos:* Province of Bataan, *Decades Philip. Forest Fl. no. 223 Borden:* Province of Laguna, *For. Bur. 7760 Curran & Merritt:* Province of Tayabas, *Merrill 2600, For. Bur. 10367, 10750 Curran, For. Bur. 214 Van Wickle:* Province of Albay, *Cuming 916.* MASBATE, *Merrill 2752.* LEYTE, *For. Bur. 12423 Danao.* MINDANAO, District of Zamboanga, *Ahern 595, For. Bur. 9475 Whitford & Hutchinson:* Lake Lanao, *Mrs. Clemens 1144, s. n.*

Native name: *Bahay* (Laguna, Tayabas, Bataan).

Endemic.

The generic name is antedated by *Toulichiba* Adans. but is here retained following the list of *nomina conservanda* of the Vienna Botanical Congress.

31. **SOPHORA** Linn.

1. **Sophora tomentosa** Linn. Sp. Pl. (1753) 373; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 249; Blanco Fl. Filip. (1837) 238, ed. 2 (1845) 229, ed. 3, **2**: 63; F.-Vill. Nov. App. (1880) 69; Vidal Sinopsis Atlas (1883) *t. 41, fig. G,* Rev. Pl. Vasc. Filip. (1886) 113.

Sophora heptaphylla Blanco l. cc., F.-Vill. l. c., non Linn.

BATANES ISLANDS, Sabtan, *Bur. Sci. 3737 Fénix.* LUZON, Province of Pangasinan, *For. Bur. 8350 Curran & Merritt:* Province of Tayabas, *Merrill 1119, 2034, 1971, For. Bur. 10249 Curran:* Province of Camarines, *Ahern 213.* POLILLO, *Bur. Sci. 9011 Robinson, Bur. Sci. 10763 McGregor.* MINDORO, *Merrill 1664, 2384, For. Bur. 9824 Merritt.* PALAWAN, *For. Bur. 3818 Curran.* MASBATE, *Merrill*

3041. NEGROS, *For. Bur. 5612 Everett*. JOLO, *Williams 3118.* MINDANAO, District of Davao, *Copeland 1322.*

Native names: *Tambalisa* (Negros, Masbate, Mindoro, Tayabas); *cápon* (Batanes Islands); *sandalaitan* (Tayabas); *cabaicabai*, ex Blanco.

Throughout the Philippines along the seashore; widely distributed in the tropics of the world.

32. CROTALARIA Linn.

Leaves simple.

Pod not longer than the calyx, which is shaggily pubescent with long, soft, brown hairs; leaves linear, 5 to 15 cm long.

Flowers blue, sessile or subsessile ..... 1. *C. sessiliflora*

Flowers yellow, their pedicels stout, 5 to 8 mm long..... 2. *C. calycina*

Pod as long as the calyx or sometimes slightly exceeding it, turgid, ovoid. (Calyx pubescent with short, appressed, gray or brown hairs; leaves linear or linear-oblong, usually less than 6 cm long) ..... 3. *C. linifolia*

Pod exserted, one-half to many times longer than the calyx, oblong.

Pods small, about 1 cm long, less than twice as long as the calyx.

Leaves linear to oblong; stems, leaves and calyces pubescent with short, appressed hairs; stipules none ..... 4. *C. albida*

Leaves orbicular-ovate to elliptic; stems, leaves and calyces pubescent with long, soft, brown, spreading hairs; stipules acicular. 5. *C. acicularis*

Pods 2 cm long or more, twice to many times as long as the calyx.

Pods glabrous; flowers yellow.

Stems diffuse; racemes lateral ..... 6. *C. ferruginea*

Stems erect; racemes terminal.

Leaves broad, rounded and retuse at the apex..... 7. *C. retusa*

Leaves acute at the apex ..... 8. *C. assamica*

Pods pubescent; flowers blue or yellow.

Flowers yellow; branches terete; stipules none or minute; leaves linear to oblong ..... 9. *C. juncea*

Flowers blue; branches prominently angled; stipules large, persistent, semilunar; leaves ovate ..... 10. *C. verrucosa*

Leaves compound.

Leaves 3-foliolate.

Pedicels 5 mm long or less.

Inflorescence mostly terminal, the racemes elongated; leaflets elliptic-obovate or obovate, broad at the apex.

Leaflets retuse, and usually with a small mucro at the apex; calyx-segments pale-greenish when dry; pods glabrous or nearly so. 11. *C. saltiana*

Leaflets manifestly apiculate-acuminate at the apex, not retuse; calyx-segments brownish-purple when dry; pods hirsute..... 12. *C. incana*

Inflorescence mostly axillary, the racemes rather short; leaflets gradually narrowed to the slender, acute or acuminate apex; pods densely pubescent ..... 13. *C. bracteata*

Pedicels 1.5 mm long, bibracteolate below the middle with very slender, 4 to 5 mm long bracteoles; calyx-segments nearly free, narrowly-lanceolate, acuminate, 1 cm long, equaling the corolla..... 14. *C. radiata*

Leaves usually 5-foliolate, varying from 3- to 7-foliolate; leaflets linear to narrowly oblanceolate ..... 15. *C. quinquefolia*

1. **Crotalaria sessiliflora** Linn. Sp. Pl. ed. 2 (1763) 1004; Benth. in Hook. Lond. Journ. Bot. **2** (1843) 565; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 73; F.-Vill. Nov. App. (1880) 57; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 390; Vidal Phan. Cuming. Philip. (1885) 107.

Crotalaria pallida Blanco Fl. Filip. (1837) 570 (?), non Dryand.

Crotalaria pumila Blanco l. c. ed. 2 (1845) 397, ed. 3, **2**: 365 (?), non Schrank.

LUZON, Province of Cagayan, (*Cuming 1258*): District of Bontoc, *For. Bur. 16540 Curran & Merritt:* Province of Benguet, *Williams 1422:* Province of Nueva Ecija, *Bur. Sci. 5282 McGregor:* Province of Laguna, *Wilkes Expedition,* in U. S. Nat. Herbarium.

Following F.-Villar, the synonyms *Crotalaria pallida* Blanco, *non* Dryand., and *C. pumila* Blanco, *non* Schrank, are placed here. It is, however, impossible to determine from Blanco's short description whether or not he had this plant, but from a knowledge of the region from which he secured his material (Mandaloyan, near Manila), and from his description, it seems more probable that he had a depauperate specimen of *C. linifolia* Linn.

India to southern China and Japan, the Malay Peninsula, Andaman Islands, and Java.

2. **Crotalaria calycina** Schrank Pl. Rar. Monac. (1819) *t. 12;* DC. Prodr. **2** (1825) 129; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 72; F.-Vill. Nov. App. (1880) 57; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 390; Vidal Phan. Cuming. Philip. (1885) 107.

LUZON, Province of Isabela, *Bur. Sci. 8099 Ramos:* District of Lepanto, *Merrill 4474:* Province of Benguet, *For. Bur. 15805 Curran, Elmer 6477, Williams 924:* Province of Pangasinan, *Bur. Sci. 4873 Ramos:* Province of Bulacan, *Yoder 137.* MINDORO, *Bur. Sci. 1519 Bermejos.* MINDANAO, *Mrs. Clemens 32, Copeland 361.*

India and Ceylon to southern China, Malaya, northern Australia, and tropical Africa.

3. **Crotalaria linifolia** Linn. f. Suppl. (1781) 322; DC. Prodr. **2** (1825) 128; Blanco Fl. Filip. (1837) 570; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 72; F.-Vill. Nov. App. (1880) 57; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) 151; Vidal Phan. Cuming. Philip. (1885) 107; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 350.

Crotalaria stenophylla Vog. Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**:7; Benth. in Hook. Lond. Journ. Bot. **2** (1843) 568.

Quirosia secunda Blanco Fl. Filip. ed. 2 (1845) 398, ed. 3, **2**:366; Naves l. c. *pl. 268.*

Crotalaria formosana Matsum. in Journ. Coll. Sci. Imper. Univ. Tokyo **12** (1900) 395; Matsum. & Hayata l. c. **22** (1906) 103, *tab. 10.*

LUZON, Province of Cagayan, *Bur. Sci. 7472 Ramos, For. Bur. 16746 Curran:* Province of Benguet, *Bur. Sci. 5759 Ramos, Williams 945:* Province of Nueva Vizcaya, *Merrill 403:* Province of Pangasinan, *Bur. Sci. 4901, 4929 Ramos:* Province of Tarlac, *Merrill 3637:* Province of Rizal, *Bur. Sci. 1447 Ramos:* Manila, *Hallier s. n., Abella 52:* Province of Tayabas, *For. Bur. 11114 Curran.* MINDANAO, Lake Lanao, *Mrs. Clemens 742.*

India to China and Formosa, south to New Guinea, northern Australia, and the Caroline Islands.

The Philippine material here referred to *Crotalaria linifolia* is rather uniform in its narrow leaves, in this character matching specimens in our herbarium from Formosa and from the Caroline Islands (*Kawakami & Kobayashi 1519; Volkens 324, 467*); this narrow-leaved form was described by Vogel from Phil-

ippine material as *C. stenophylla,* which Bentham [33] considered to be distinct from *C. linifolia* Linn. f., distinguished from the latter by its narrow leaves, slightly smaller flowers, and broader upper calyx-lobes. Baker,[34] working with more abundant material, reduced *C. stenophylla* to *C. linifolia* Linn. f., and I have followed him in this matter. I consider *C. formosana* Matsum. to be unquestionably identical with *C. stenophylla* Vog., and here reduce it with the latter to *C. linifolia* Linn. f.

4. **Crotalaria albida** Heyne ex Roth Nov. Sp. Pl. (1821) 333; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 71; F.-Vill. Nov. App. (1880) 57; Vidal Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. Filip. (1886) 105.

LUZON, Province of Cagayan, *Bur. Sci. 7414 Ramos, For. Bur. 16486 Bacani:* District of Bontoc, *For. Bur. 16539 Curran & Merritt:* Province of Ilocos Norte, *Bur. Sci. 2337 Mearns, For. Bur. 15504 Merritt & Darling:* Province of Benguet, *Elmer 6616, Merrill 4406:* Province of Pangasinan, *Bur. Sci. 4817 Ramos.*

India to southern China, Formosa, and the Malay Peninsula.

5. **Crotalaria acicularis** Ham. in Wall. Cat. (1832) no. 5390; Benth. in Hook. Lond. Journ. Bot. **2** (1843) 476; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 68; F.-Vill. Nov. App. (1880) 57.

Crotalaria prostrata Ceron Cat. Pl. Herb. (Manila) (1892) 60, nec Roxb. nec Rottl.

LUZON, Province of Benguet, *Merrill 4266, Williams 1419, Elmer 5826:* Province of Rizal, *Bur. Sci. 1838 Ramos:* without locality, *Vidal 2645, Loher 2399,* in Herb. Kew. MINDANAO, *Mrs. Clemens 210.*

Bengal to Ava, Tenasserim, and Java; not reported from southern China or from the Malay Peninsula.

This form has been identified at Kew both as *Crotalaria humifusa* Grah. (*Merrill 4266*), and as *C. prostrata* Roxb. (*Elmer 5826, Loher 2399, Vidal 2645*), but there seems to be a single species represented, which, from the original descriptions, agrees most closely with *C. acicularis* Ham. The presence of acicular stipules on the Philippine material at once excludes the possibility of it being referable to *C. prostrata* Roxb., which is described as being without stipules; the sessile pods, containing about 15 seeds, apparently would place the specimens with *C. acicularis,* rather than with *C. humifusa,* as the latter species is said to have a short-stalked pod containing but 6 to 8 seeds.

6. **Crotalaria ferruginea** Grah. in Wall. Cat. (1832) no. 5398; Benth. in Hook. Lond. Journ. Bot. **2** (1843) 476; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 68; F.-Vill. Nov. App. (1880) 57; Vidal Phan. Cuming. Philip. (1885) 107.

Crotalaria ferruginea var. *major* Benth. l. c. 477.

LUZON, Province of Cagayan, *For. Bur. 16476, 16480 Bacani:* Province of Benguet, *Williams 1410, 1411, For. Bur. 15734 Curran & Merritt, Bur. Sci. 4452 Mearns:* Province of Zambales, *For. Bur. 5864 Curran:* Province of Nueva Vizcaya, *Merrill 319.* MINDANAO, District of Davao, *Copeland 590:* Province of Cotabato, *Mrs. Clemens s. n.:* Lake Lanao, *Mrs. Clemens s. n.:* Province of Misamis, *Cuming 1628* (cotype of the var. *major* Benth.).

India to China and Formosa, south to the Malay Peninsula and Archipelago.

Both the typical form and the var. *major* are represented in the material cited above under this species; the latter apparently intergrades, judging from the material at present available for comparison.

Crotalaria chinensis Linn. has been reported from the Philippines by Bentham,[35]

[33] Hook. Lond. Journ. Bot. **2** (1843) 568.
[34] Hook. f. Fl. Brit. Ind. **2** (1878) 72.
[35] Hook. Lond. Journ. Bot. **2** (1843) 566.

(*Cuming 1604*), in which he has been followed by later authors, Baker, F.-Villar, and Vidal. I have examined the specimen in the Kew Herbarium, and it seems to be comparable with *Merrill 319*, cited above. Unfortunately my specimen is in flower, but identical forms bearing both flowers and fruits, have the latter much exceeding the calyx, while *C. chinensis* has a short pod, which is not exserted. It seems probable that Cuming's specimen is really referable to *C. ferruginea*, and that typical *C. chinensis* Linn. has not been as yet found in the Philippines.

7. **Crotalaria retusa** Linn. Sp. Pl. (1753) 715; Miq. Fl. Ind. Bat. 1 [1] (1855) 330; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 75; F.-Vill. Nov. App. (1880) 57; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 38; Perk. Frag. Fl. Philip. (1904) 16.

LUZON, Province of Tayabas, *Bur. Sci. 3101 Mearns, For. Bur. 9579 Curran.* PALAWAN, *Bur. Sci. 297 Bermejos.* GUIMARAS, *For. Bur. 28 Ritchie.* NEGROS, *For. Bur. 4272 Everett.* MINDANAO, District of Davao, *DeVore & Hoover 219, Williams 2689, Copeland 576.*

Native name: *Calogcalog* (Negros).

Cosmopolitan in the tropics.

8. **Crotalaria assamica** Benth. in Hook. Lond. Journ. Bot. 2 (1843) 481; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 75; F.-Vill. Nov. App. (1880) 57; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105.

LUZON, Province of Abra, *Bur. Sci. 7255 Ramos:* Province of Bataan, *For. Bur. 2021 Borden:* Province of Zambales, *Hallier s. n.:* without locality, (*Cuming 1886*).

British India.

9. **Crotalaria juncea** Linn. Sp. Pl. (1753) 714; DC. Prodr. 2 (1825) 125; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 79.

LUZON, Province of Ilocos Norte, *Bur. Sci. 7608 Ramos, Bur. Sci. 2287 Mearns:* Manila, *Merrill 6233* (cultivated), *Cuzner 58* (cultivated).

A native of British India, and there cultivated for its fiber; extending through Malaya to northern Australia. Apparently spontaneous in northern Luzon. The sunn hemp.

10. **Crotalaria verrucosa** Linn. Sp. Pl. (1753) 715; Baker in Hook. f. Brit. Ind. 2 (1876) 77; F.-Vill. Nov. App. (1880) 57; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64.

Crotalaria angulosa Lam. Encycl. 2 (1786) 197; Cav. Ic. 4 (1797) 10, *pl. 321.*

Phaseolus bulai Blanco Fl. Filip. (1837) 572.

Quirosia anceps Blanco l. c. ed. 2 (1845) 398, ed. 3, 2: 367.

LUZON, Province of Bataan, *Merrill 3308, Elmer 6741, For. Bur. 2181 Meyer:* Province of Tayabas, *For. Bur. 11117 Curran.* MINDORO, *Merrill 911.* MASBATE, *Merrill 3396.* NEGROS, *For. Bur. 5592 Everett.* CEBU, *Hallier s. n.* MINDANAO, District of Zamboanga, *Copeland s. n.*

Native names: *Gulung-gulung* (Negros); *calayacai* (Mindoro); *bulai lava*, ex Blanco.

Widely distributed in the Philippines at low altitudes; tropics of the world.

11. **Crotalaria saltiana** Andr. Bot. Rep. (1811) *t. 648;* Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 41, 353.

Crotalaria striata DC. Prodr. 2 (1825) 131; Miq. Fl. Ind. Bat. 1[1] (1855) 346; Perk. Frag. Fl. Philip. (1904) 16; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 84.

PANAY, *Merrill 2414, Yoder 35.*

Native names: *Gorung-gorung, colung-colung* (Panay).

Widely distributed in the tropics of the world.

12. **Crotalaria incana** Linn. Sp. Pl. (1753) 716; Miq. Fl. Ind. Bat. 1 [1] (1855) 347; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 83; Naves in Blanco Fl. Filip. ed. 3, *pl. 160;* F.-Vill. Nov. App. (1880) 58; Vidal Rev. Pl. Vasc. Filip. (1886) 104; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 409.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4085 Fénix.* LUZON, Province of Cagayan, *For. Bur. 17103 Curran:* Manila, *Merrill 20, Cuzner 43, Elmer 5526, McGregor 56:* Province of Rizal, *Bur. Sci. 1405 Ramos.* MINDORO, *Bur. Sci. 928 Mangubat, Merrill 1275, 1666.*

Native names: *Latuc-latucan* (Manila); *bulailaua* (Rizal); *bolelaua, potoc-potocan* (Mindoro).

A native of tropical America; now widely distributed in the tropics of the world; very abundant in waste places about towns in the Philippines.

13. **Crotalaria bracteata** Roxb. Fl. Ind. 3 (1832) 278; Benth. in Hook. Lond. Journ. Bot. 2 (1843) 586; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 83; F.-Vill. Nov. App. (1880) 58; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 104.

LUZON, Province of Benguet, *Merrill 4316, For. Bur. 15707 Merritt & Darling, Bur. Sci. 5334 Ramos:* Province of Pangasinan, (*Cuming 1009*).

British India, and, according to Baker, the Malay Archipelago; not reported from the Malay Peninsula.

14. **Crotalaria radiata** sp. nov.

Herba erecta, ramosa, circiter 40 cm alta, omnibus partibus leviter pilosis; foliis trifoliolatis, stipulis nullis; foliolis parvis, ellipticis vel obovato-ellipticis, 1 ad 2 cm longis, apice late rotundatis, brevissime apiculatis; racemis axillaribus terminalibusque, circiter 10 cm longis; pedicellis 1.5 cm longis, bibracteolatis; floribus, ut videtur, flavis; calycis segmentis anguste lanceolatis, 1 cm longis, subaequalibus, persistentibus, radiatis, corollam aequantibus; leguminibus junioribus pilosis, anguste oblongis, stipitatis, acuminatis; seminibus 25 ad 30.

An annual, erect, much branched herb, at least 40 cm high, all parts sparingly pubescent with scattered, rather soft, whitish hairs, or the mature leaflets glabrous or nearly so. Branches terete, slender, greenish. Leaves trifoliolate, the petiole 1.5 to 2 cm long; stipules none; leaflets elliptic to obovate-elliptic, membranaceous, 1 to 2 cm long, about 1 cm wide, all very shortly petiolulate, the base broadly cuneate, the apex rounded, very shortly apiculate, when young with scattered hairs on both surfaces, when mature glabrous on the upper surface. Racemes terminal and axillary, about 10 cm long; pedicels slender, 1.5 cm long, each with two setaceous stipules below the middle 4 to 5 mm in length. Calyx cleft nearly to the base into five narrowly lanceolate, acuminate, subequal segments, about 10 mm long, 2.5 mm wide, which are persistent in fruit, slightly accrescent, and radiately disposed, becoming ultimately quite free. Corolla apparently yellow, as long as the calyx-segments. Ovary pubescent. Young pods narrowly oblong, 1.5 cm long, pilose, stipitate, the apex long and slenderly acuminate, straight or somewhat curved, each containing from 25 to 30 seeds. Mature pods unknown.

LUZON, Province of Nueva Vizcaya, Dupax, in agricultural lands near the river, *Bur. Sci. 8244 Ramos*, May, 1909.

A species well characterized by its small, trifoliolate leaves, absence of stipules, its long-pedicelled flowers, each pedicel with a pair of elongated, very narrow bracteoles below the middle, and more especially by its narrowly lanceolate, subequal calyx-lobes equal to the corolla in length, which are persistent, ultimately quite free, and radiately arranged at the base of the pod.

15. **Crotalaria quinquefolia** Linn. Sp. Pl. (1753) 716; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 84; Blanco Fl. Filip. (1837) 569, ed. 2 (1845) 397, ed. 3, **2**: 365; Naves l. c. *pl. 159;* F.-Vill. Nov. App. (1880) 58; Vog. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. 1: 9.

LUZON, Province of Cagayan, *Bur. Sci. 7888 Ramos:* Province of Ilocos Norte, *Bur. Sci. 2315 Mearns:* Province of Pampanga, *Bolster 39:* Province of Rizal, *Guerrero 26, For. Bur. 3297, 3277 Ahern's collector, Manotok 53:* Province of Tayabas, *Gregory 40, Whitford 743, For. Bur. 7470 Reyes.* POLILLO, *Bur. Sci. 9237 Robinson.* CEBU, *Lyon s. n.* MINDANAO, *Mearns s. n.*

Native names: *Putucan* (Tayabas); *palpatoc* (Union); *patoc-patocan, bulailaua* (Rizal): *catanda, susoi, susosusoyan, balatong-aso,* ex Blanco.

Widely distributed in the Philippines at low altitudes, frequent as a rice-paddy weed; India to the Malay Peninsula and Archipelago.

EXCLUDED SPECIES.

CROTALARIA LABURNIFOLIA Linn.; F.-Vill. Nov. App. (1880) 58.

This species was first credited to the Philippines by Baker,[36] possibly on an erroneously localized plant of Cuming's collection. F.-Villar states that he saw living specimens in Luzon and Panay. The species is not represented by any extant Philippine material known to me.

CROTALARIA SERICEA Retz.; F.-Vill. l. c. 57. Probably an erroneous identification for *C. retusa* Linn. *C. sericea* Retz. is not represented by any extant Philippine material known to me.

33. MEDICAGO Linn.

1. **Medicago denticulata** Willd. Sp. Pl. **3** (1803) 1414; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 90; Britt. & Br. Ill. Fl. Northern U. S. **2** (1897) 272, *fig. 2066.*

LUZON, Province of Benguet, *Bur. Sci. 2722, 3473 Mearns.*

A species undoubtedly of recent introduction which may or may not persist; Europe and Asia to China and Japan; naturalized in North America.

MEDICAGO SATIVA Linn., alfalfa, has been introduced a number of times by the Philippine Bureau of Agriculture, and has been cultivated in numerous places from sea level to an altitude of 2,000 m (Pauai, Province of Benguet, Luzon, *Merrill 4798*). It does not appear to be adapted to conditions in the Philippines and rapidly dies out.

TRIFOLIUM Linn. Four species of *Trifolium* have been found in the Philippines, all apparently of recent introduction, either purposely for cultivation as forage plants, or accidentally in hay. All of them have produced flowers at altitudes of from 800 to 2,000 m, but it is very doubtful if any of them will persist. *T. hybridum* Linn., "Alsike clover" is represented by *Bur. Sci. 4344 Mearns,* cultivated at Pauai, Province of Benguet, Luzon. *T. incarnatum* Linn., "crimson clover," by *Bur. Sci. 8399 McGregor,* cultivated at the same place as the preceding. *T.*

[36] Hook. f. Fl. Brit. Ind. **2** (1876) 84.

pratense Linn., "red clover," *Merrill 4323*, cultivated at Baguio, Province of Benguet, Luzon, and by an unnumbered specimen collected by *Mrs. Clemens* at Camp Keithley, Mindanao. *T. repens* Linn., "white clover," *Merrill 4319*, near construction camps on the Benguet Road, Province of Benguet, Luzon.

34. INDIGOFERA Linn.

Leaves simple; pods globose, small, 1-seeded (§ SPHAERIDIOPHORA).. 1. *I. linifolia*
Leaves simple, trifoliolate, or pinnate; pods oblong or linear, seeds several to many (§ EUINDIGOFERA).
Leaves simple ..... 2. *I. unifoliolata*
Leaves trifoliolate ..... 3. *I. trifoliata*
Leaves pinnate.
An erect shrub or tree 3 to 8 m high; calyx shortly toothed; pods ascending or spreading, not reflexed ..... 4. *I. zollingeriana*
Herbaceous, suffrutescent, or shrubby, less than 1 m high; calyx deeply cleft; pods reflexed.
Stems, leaves and inflorescence densely pubescent; pods straight, densely hirsute with spreading, usually brown hairs..... 5. *I. hirsuta*
Glabrous or subglabrous, if at all pubescent, then the hairs short, scattered, appressed; pods straight or curved.
Racemes elongated, 13 to 20 cm long; pods laxly arranged, straight. 6. *I. nigrescens*
Racemes short, 3 to 5, rarely 10 cm in length.
Pods short, much curved, 1 to 1.5 cm long, 6- to 8-seeded; leaves acute or subacute, acuminate ..... 7. *I. suffruticosa*
Pods straight, or curved only near the apex, 2 to 3 cm long, 8- to 12-seeded; leaves usually rounded at the apex, acuminate. 8. *I. tinctoria*

1. **Indigofera linifolia** Retz. Obs. 4 (1786) 29; DC. Prodr. 2 (1825) 222; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 92; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 195.

Sphaeridiophorum linifolium Desv. Journ. Bot. 3 (1813) 125, *t. 6, fig. 35.*

LUZON, Province of Ilocos Norte, *For. Bur. 15506 Merritt & Darling:* Province of Benguet, *Merrill 4387.*

Abyssinia and Afghanistan through India to southern China, the Malay Archipelago and northern Australia; not reported from the Malay Peninsula.

2. **Indigofera unifoliolata** sp. nov. § *Euindigofera, Simplicifoliae.*

Erecta, suffruticosa, circiter 40 cm alta, ramis ramulisque tenuibus, teretibus, adpresse pubescentibus; foliis simplicibus, breviter petiolatis, anguste oblongis, usque ad 3 cm longis, obtusis, leviter adpresse pubescentibus, stipulis nullis; racemis axillaribus, brevibus, congestis, 5- ad 8-floris; leguminibus anguste oblongis, 1 ad 1.5 cm longis, reflexis, 4-angulatis.

An erect perennial from a stout woody root, about 40 cm high, sparingly branched, the stems and branches slender, terete, reddish-brown, slightly pubescent with short appressed hairs. Leaflet one, narrowly oblong, 1.5 to 3 cm long, 3 to 5 mm wide, chartaceous, somewhat pubescent with short appressed hairs on both surfaces, the apex

obtuse, sometimes apiculate, the base acute, the lower surface somewhat paler than the upper, not glandular; petioles about 2 mm long; stipules none. Racemes axillary, usually solitary, slightly exceeding the petiole in length, each with from 5 to 8 densely disposed pinkish flowers. Flowers about 4 mm long, the calyx-teeth very slenderly acuminate. Pods few, usually one or two in each raceme, reflexed, narrowly oblong, straight, acuminate, 10 to 15 mm long, strongly 4-angled, ridged along one side, about 1.8 mm thick, sparingly pubescent with short appressed hairs, each containing from 5 to 8 seeds.

LUZON, Province of Rizal, Morong, along the borders of Lake Bay, *Bur. Sci. 1411 Ramos*, August, 1906.

A species with much the appearance of, and certainly allied to *Indigofera trifoliata* Linn., differing from that species in its simple leaves, which are not at all glandular beneath, and absence of stipules.

3. **Indigofera trifoliata** Linn. Amoen. Acad. **4** (1759) 327; Sp. Pl. ed. 2 (1763) 1062; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 96; F.-Vill. Nov. App. (1880) 58; Vid. Rev. Pl. Vasc. Filip. (1886) 106; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 411.

BATANES ISLANDS, Sabtan, *Bur. Sci. 3724 Fénix.* LUZON, Province of Cagayan, *For. Bur. 16487, 16507 Bacani, Bur. Sci. 7878 Ramos:* Province of Pangasinan, *Bur. Sci. 4906, 4851 Ramos:* Province of Rizal, *For. Bur. 3288 Ahern's collector.*

India and Ceylon to southern China, Malaya, and northern Australia; rather variable in vegetative characters.

4. **Indigofera zollingeriana** Miq. Fl. Ind. Bat. 1^1 (1855) 310.

Indigofera tesymanni Miq. l. c. (1858) 1083; Prain & Baker in Journ. Bot. **40** (1902) 143; Merr. in Forestry Bureau (Philip.) Bull. **1** (1903) 24; Perk. Frag. Fl. Philip. (1904) 16.

Indigofera galegoides Vid. Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105; F.-Vill. Nov. App. (1880) 59, non DC.

Indigofera benthamiana Hance in Ann. Sci. Nat. IV **18** (1862) 219.

BATANES ISLANDS, Batan, *Bur. Sci. 3190 Mearns.* LUZON, Province of Ilocos Norte, *For. Bur. 15508 Merritt & Darling:* Province of Benguet, *Merrill 4416, Williams 1288:* Province of Pangasinan, *For. Bur. 8310 Curran & Merritt:* Province of Rizal, *Merrill 5043:* Province of Camarines, *For. Bur. 10666 Curran, Ahern 234, 235.* MINDANAO, Province of Surigao, *Ahern 434.*

Southern China and Formosa to Cochin-China, the Malay Peninsula and Archipelago to New Caledonia.

Indigofera zollingeriana Miq., has not only page priority over *I. teysmanni*, but the part of the volume containing the description of it antedates the part containing the description of *I. teysmanni* by about three years. This is much the largest of our Philippine species, sometimes reaching a height of about 8 m. It extends from sealevel to an altitude of at least 1000 m. It differs from all the other Philippine species in its short calyx-teeth, and in its pods being pointed forward in the direction of the main axis of the raceme, or more or less spreading, but not reflexed.

5. **Indigofera hirsuta** Linn. Sp. Pl. (1753) 751; DC. Prodr. **2** (1825) 228; Miq. Fl. Ind. Bat. 1^1 (1855) 304; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 98; F.-Vill. Nov. App. (1880) 58; Prain & Baker in Journ. Bot. **40** (1902) 136.

Indigofera angustifolia Blanco Fl. Filip. (1837) 596, ed. 2 (1845) 415, ed. 3, **2**: 394, non Linn.

LUZON, Province of Cagayan, *For. Bur. 18612 Klemme, Bur. Sci. 7802 Ramos:* Province of Abra, *Bur. Sci. 7120 Ramos:* Province of Benguet, *Williams 944, 1417:* Province of Pangasinan, *Alberto 32:* Province of Zambales, *For. Bur. 5852 Curran:* Province of Rizal, *Bur. Sci. 1413 Ramos, Merrill 2718:* Manila, *Merrill 3466, Cuzner 57.* MINDANAO, Lake Lanao, *Mrs. Clemens 206.*

Native name: Tayom-tayom, tayom-tayoman (Manila).

A weed in waste places at low altitudes, widely distributed in the Philippines; tropics of the world.

6. **Indigofera nigrescens** Kurz ex Prain in Journ. As. Soc. Beng. **67**[2] (1898) 286; C. B. Robinson in Philip. Journ. Sci. **3** (1908) Bot. 183.

LUZON, Province of Benguet, *Williams 925, 1413, Bur. Sci. 3462, 4273, 4396, 4458 Mearns, Elmer 6582, Merrill 6395, For. Bur. 16225 Curran, Merritt, & Zschokke.*

Khasia Mountains and southwestern China.

7. **Indigofera suffruticosa** Mill. Gard. Dict. ed. 8 (1768) no. 2; Prain & Baker in Journ. Bot. **40** (1902) 137, 138, sub *I. anil* Linn.

Indigofera anil Linn. Mant. **2** (1771) 272; Miq. Fl. Ind. Bat. **1**[1] (1855) 307; F.-Vill. Nov. App. (1880) 58; Vidal Phan. Cuming. Philip. (1885) 107; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 410; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 81.

Indigofera tinctoria Blanco Fl. Filip. (1837) 591, ed. 2 (1845) 413, ed. 3, 2:393, saltem pro parte, non Linn.

BATANES ISLANDS, Batan, *Bur. Sci. 3596 Fénix.* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 3965 Fénix;* Dalupiri, *Bur. Sci. 10116 McGregor.* LUZON, Province of Cagayan, *For. Bur. 16465 Bacani, Bur. Sci. 7854 Ramos:* Province of Ilocos Norte, *Bur. Sci. 7621 Ramos, For. Bur. 13884, 15528 Merritt & Darling:* Province of Tayabas, *Whitford 601, Gregory 66.* MINDORO, *Merrill 872, 1261, For. Bur. 5477 Merritt, Bur. Sci. 6661 Robinson.* MASBATE, *Merrill 3403.* CEBU, *Barrow 1.* GUIMARAS, *For. Bur. 27 Ritchie.* PANAY, *Copeland s. n.* MINDANAO, District of Davao, *Williams 2753.*

Native names: *Tayom, tayung, tayum, tagum* in most islands and provinces; *pauay* (Batanes Islands). Indigo.

Widely distributed in the Philippines, formerly extensively cultivated for extraction of indigo. A native of tropical America, now widely distributed in the tropics of the world.

8. **Indigofera tinctoria** Linn. Sp. Pl. (1753) 751; Miq. Fl. Ind. Bat. **1**[1] (1855) 306; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 99; F.-Vill. Nov. App. (1880) 58; Prain & Baker in Journ. Bot. **40** (1902) 63.

Indigofera argentea Blanco Fl. Filip. ed. 2 (1845) 415, ed. 3, **2**: 394 (?) non Linn.

LUZON, Province of Pangasinan, *For. Bur. 4897 Curran:* Province of Camarines, *Ahern 227, Bur. Sci. 6321 Robinson.* CEBU, *Hallier s. n.* MINDANAO, District of Davao, *DeVore & Hoover 156.*

Native names: the same as for the preceding species, also *tagung-tagung* (Davao); *tayong-tayongan* (Camarines).

Like the preceding species, formerly cultivated for indigo; widely distributed in the tropics of the world.

35. **PSORALEA** Linn.

1. **Psoralea badocana** Blanco Fl. Filip. ed. 2 (1845) 416, ed. 3, **2**: 395; F.-Vill. Nov. App. (1880) 58; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105.

Liparia badocana Blanco Fl. Filip. (1837) 597.

Meladenia densiflora Turcz. in Bull. Soc. Nat. Mosc. **21**[1] (1848) 576.

LUZON, Province of Abra, *Bur. Sci. 7240 Ramos:* District of Bontoc, *Bur. Sci. 7011 Ramos:* Province of Ilocos Sur, *Cuming 1149:* Province of Ilocos Norte, *Bur. Sci. 2234 Mearns:* Province of Pangasinan, *Bur. Sci. 4907 Ramos.* PANAY, (*Cuming 1649*).

Endemic.

36. **PAROSELA** Cav. (*Dalea* Linn.)

1. **Parosela glandulosa** (Blanco) comb. nov.

Amorpha glandulosa Blanco Fl. Filip. (1837) 555.

Dalea alopecuroides Blanco l. c. ed. 2 (1845) 389, ed. 3, **2**: 351; F.-Vill. Nov. App. (1880) 58, non Willd.

Dalea nigra Mart. & Gal. in Bull. Acad. Brux. **10**[2] (1843) 43; Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 309; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105; Perk. Frag. Fl. Philip. (1904) 16.

Dalea glandulosa Merr. in Govt. Lab. Publ. (Philip.) **27** (1905) 37, Philip. Journ. Sci. **1** (1906) Suppl. 64.

Parosela nigra Rose in Contr. U. S. Nat. Herb. **10** (1906) 105.

LUZON, Province of Abra, *Bur. Sci. 7128 Ramos:* Province of Ilocos Norte, *For. Bur. 15546 Merritt & Darling:* Province of Benguet, *Merrill 4351, For. Bur. 16226 Curran, Merritt, & Zschokke:* Province of Union, *Elmer 5601:* Province of Pangasinan, *Bur. Sci. 4888 Ramos:* Province of Bataan, *Whitford s. n.:* Province of Rizal, *Bur. Sci. 1844 Ramos, Merrill 1349, Hidalgo 366, Nieva 266.*

Native names: *Agogo, sampaloc-sampalocan, chaang-parang* (Rizal): *duran-parang, camangi,* ex Blanco.

A native of tropical America, introduced into the Philippines at an early date, and now locally very abundant in many localities. First described from Philippine material.

The reasons for taking up the generic name *Parosela* for the species generally known as *Dalea* are given by Rose, *l. c.*, **8** (1903) 302, and the case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress. In connection with Doctor Rose's argument, it may be well, perhaps, to call attention to the fact that *Dalea* Gaertner (1788), antedates the restoration of the Linnean *Dalea,* which was first taken up after the establishment of the binomial system by Jussieu (1789) followed by Ventenat, Cramer, and Willdenow. According to strict priority *Dalea* Gaertner is the oldest name for the plants usually placed in the genus *Microdon* Choisy (1823), and as this case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress, then according to the principle of priority adopted by that Congress, *Dalea* Gaertn. must displace *Microdon* Choisy, and in thus becoming a "valid" genus must of necessity invalidate the use of the same name for a different genus.

37. **TEPHROSIA** Pers.

Pods about 8 cm long, densely covered with rather long, brown hairs; leaflets elliptic or narrowly elliptic, 3 to 4 cm long..... 1. *T. vestita*

Pods 2 to 3.5 cm long, gray-puberulent or subglabrous; leaflets less than 2.5 cm in length.

Racemes elongated, lax, much exceeding the leaves, 10 to 15 cm long; pods 6- to 8-seeded ..... 2. *T. purpurea*

Racemes short, congested, less than 5 cm in length.

Leaflets narrowly oblong, 5- to 10-jugate; pods 8- to 10-seeded, usually densely arranged, their pedicels 2 to 3 mm long..... 3. *T. dichotoma*

Leaflets obovate or narrowly obovate, 4- or 5-jugate; pods 5- to 8-seeded, few, laxly arranged, their pedicels 5 to 7 mm long..... 4. *T. obovata*

1. **Tephrosia vestita** Vog. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 15; Rolfe in Journ. Bot. **23** (1885) 212; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) 158; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 106; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 353.

MINDANAO, Province of Misamis, *Cuming 1621:* Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

Southern China, Java, New Guinea.

2. **Tephrosia purpurea** (Linn.) Pers. Syn. Pl. **2** (1807) 329; Baker in Hook. f. Fl. Ind. **2** (1876) 112; Trimen Fl. Ceyl. **2** (1894) 31; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 85.

Cracca purpurea Linn. Sp. Pl. (1753) 752.

LUZON, Province of Cavite, *Bur. Sci. 1315 Mangubat,* August, 1906.

This species, as interpreted by most authors, is exceedingly variable, and includes a number of forms; what I take to be the typical form, that is, the Ceylon plant, for the type of the species was from that island, seems to extend from India and Ceylon to southern China, more or less throughout Malaya, to northern Australia; some authors give its range as the tropics of the world.

3. **Tephrosia dichotoma** Desv. Ann. Sci. Nat. **9** (1826) 415; Miq. Fl. Ind. Bat. **1**[1] (1855) 298.

Tephrosia luzoniensis Vog. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 15; Miq. l. c. 299; F.-Vill. Nov. App. (1880) 59; Perk. Frag. Fl. Philip. (1904) 17.

Indigofera hirsuta Blanco Fl. Filip. (1837) 591, non Linn.

Indigofera senegalensis Blanco l. c. ed. 2 (1845) 412, ed. 3, **2**: 392; Naves l. c. *pl. 162,* non Lam.

Tephrosia piscatoria A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 407, quoad pl. Philip., non Pers.

LUZON, Province of Abra, *Bur. Sci. 7121 Ramos:* Province of Ilocos Norte, *For. Bur. 15545 Merritt & Darling, Bur. Sci. 2296 Mearns:* Province of Zambales, *Merrill 327, For. Bur. 5851 Curran:* Manila, *Merrill 369, Elmer 5535, Millares 58, Milaor 328:* Province of Rizal, *Bur. Sci. 1397 Ramos:* Province of Laguna, *Williams 2044, Hallier s. n.*

This is undoubtedly the form credited to the Philippines by Vidal[37] as *Tephrosia purpurea* Pers. It seems, however, to be distinct from that species, and is well characterized by its short, rather dense racemes, usually densely arranged pods, and more numerous seeds. The type of *Tephrosia luzoniensis* Vog., in the Berlin Herbarium, has been examined by me and found to agree with the specimens above cited. The identification of *T. dichotoma* Desv. is based on the description, which applies closely, except that the leaflets are described as being 4-jugate, while in the material before me they vary from 5- to 10-jugate.

4. **Tephrosia obovata** sp. nov. § *Reineria, Pinnatae.*

Fruticosa, diffusa, 20 ad 40 cm alta, ramulis junioribus, subtus foliolis, inflorescentiisque plus minus adpresse argenteo-pubescentibus; foliis 1.5

[37] Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 106.

ad 2 cm longis; foliolis 4- vel 5-jugatis, obovatis vel anguste obovatis, apice truncatis vel retusis, apiculatisque, supra glabris, 7 ad 10 mm longis; racemis terminalibus axillaribusque, paucifloris, folia subaequantibus; folliculis anguste oblongis, puberulis, 2 ad 2.5 cm longis, longe pedicellatis, seminibus 5 ad 8.

A rather diffuse shrubby plant 20 to 40 cm high, the young branchlets, under surface of the leaves and inflorescence more or less silvery pubescent with appressed, short hairs. Stems brown or gray, strongly lenticellate, glabrous, the branches slender. Leaves 1.5 to 2 cm long, the leaflets rather crowded, 4- or 5-jugate, obovate or narrowly obovate, 7 to 10 mm long, 5 to 7 mm wide, the apex truncate or retuse, apiculate, the base acute, the upper surface glabrous, the lower more or less silvery-pubescent, the petiolules very short; stipules linear, about 2 mm long. Racemes mostly terminal, about as long as the leaves, silvery-pubescent, few-flowered. Flowers purplish, about 8 mm long, the calyx-teeth slenderly acuminate. Pods 2 to 2.5 cm long, 3 to 4 mm wide, rather densely puberulent, straight or nearly so, acuminate, flat, each containing from 5 to 8 seeds; pedicels 5 to 7 mm long.

LUZON, Province of Cagayan (Palaui Island), *For. Bur. 16939 Curran*, March, 1909: Province of Ilocos Norte, *Bur. Sci. 2341 Mearns*, January, February, 1907. Locally known on Palaui Island as *Carcardis*.

This species is well characterized by its obovate or narrowly obovate, rather small, crowded leaflets, its short terminal racemes, and its long-pedicelled pods, differing from other Philippine forms in these characters. It is manifestly allied to *Tephrosia dichotoma* Desv., and also, but less strongly, to *T. purpurea* (L.) Pers.

As for the generic name, *Cracca* Linn. (non Benth.), is manifestly the oldest one. *Tephrosia* Pers., has, however, been included in the list of *nomina conservanda* of the Vienna Botanical Congress, and is accordingly here retained.

38. MILLETTIA W. & A.

Branchlets brown-pubescent; leaflets 1- or 2-jugate; inflorescence paniculate, rusty-puberulous, longer than the leaves ..... 1. *M. longipes*

Branchlets glabrous or subglabrous; leaflets 2- to 5-jugate; inflorescence of simple, glabrous racemes which are usually shorter than the leaves.

Pods up to 22 cm long, 2.5 to 3 cm wide; leaflets 3- or 4-jugate, frequently 10 cm long, the veins distinct ..... 2. *M. ahernii*

Pods less than 15 cm in length, and less than 2 cm in width.

Leaves 15 to 20 cm long.

Leaflets firmly coriaceous, 3-jugate, blunt-acuminate, 6 to 9 cm long. 3. *M. canariifolia*

Leaflets membranaceous or chartaceous mostly sharp-acuminate.

Leaflets 4- or 5-jugate; flowers 1 cm long, the standard entire or only slightly cleft at the apex ..... 4. *M. merrillii*

Leaflets 2- or 3-jugate; flowers 2 cm long, the standard strongly cleft at the apex ..... 5. *M. cavitensis*

Leaves less than 10 cm long; leaflets 2- or 3-jugate; flowers 1.5 cm long, the standard somewhat cleft at the apex ..... 6. *M. foxworthyi*

1. **Millettia longipes** Perk. Frag. Fl. Philip. (1904) 80.

LUZON, Province of Isabela, Malunu, *Warburg 12094, 12095, 12112,* in Herb. Berol.

Endemic.

2. **Millettia ahernii** Merr. & Rolfe in Philip. Journ. Sci. **3** (1908) Bot. 103.

The type of this species is *For. Bur. 3373 Ahern's collector*, Bosoboso, Province of Rizal, Luzon. I am disposed to refer to it also the following specimens: LUZON, Province of Ilocos Sur, *For. Bur. 5655 Klemme:* Province of Rizal, *Bur. Sci. 5221 Ramos.* LEYTE, *For. Bur. 12436 Danao.*

The species is manifestly allied to *M. merrillii,* but differs in its larger pods, and much larger leaflets which have prominent nerves.

Native names: *Baloc, baloc-baloc* (Rizal); *bani* (Ilocos).

Endemic.

3. **Millettia canariifolia** sp. nov.

Arbor glabra circiter 8 m alta; foliis 18 ad 20 cm longis; foliolis 3-jugatis, coriaceis, ovatis vel oblongo-ovatis, usque ad 9 cm longis, in sicco nitidis, subtus pallidioribus, basi late rotundatis, apice breviter late acuminatis, nervis utrinque 6 vel 7, vix prominentibus; folliculis usque ad 13 cm longis, 1.8 cm latis, planis, leviter falcatis, basi angustatis, apice longe acuminatis.

A glabrous tree about 8 m high. Branches terete, reddish-brown, lenticellate. Leaves 18 to 20 cm long, odd-pinnate; leaflets 3-jugate, ovate or oblong-ovate, coriaceous, rather pale and shining when dry, the lower surface paler than the upper, 6 to 9 cm long, 2 to 4 cm wide, the base rather broad, rounded, the apex shortly and obtusely blunt-acuminate; nerves 6 or 7 on each side of the midrib, not distinct, irregular, obscurely anastomosing, the reticulations lax, indistinct; petiolules 5 to 8 mm long. Flowers unknown. Pods rather woody, flat, narrowly oblong, 9 to 13 cm long, 1.5 to 1.8 cm wide, obscurely wrinkled when dry, not lenticellate, slightly curved, rather gradually narrowed below, the apex strongly and slenderly acuminate, the acumen curved, 1 to 1.5 cm long.

LUZON, Province of Zambales, Candelaria, *Bur. Sci. 4711, 4727 Ramos,* December 7, 1907, locally known as *Malapatpat.*

The leaves, and especially the leaflets, although smaller, are suggestive of those of *Canarium luzonicum* A. Gray, whence the specific nane.

4. **Millettia merrillii** Perk. Frag. Fl. Philip. (1904) 81; Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 18.

Millettia xylocarpa Naves in Blanco Fl. Filip. ed. 3, *pl. 79;* Vidal Sinopsis Atlas (1883) *t. 41, fig. B,* non Miq.

Millettia caerulea F.-Vill. Nov. App. (1880) 59, non Baker.

LUZON, Province of Isabela, *Bur. Sci. 8061 Ramos:* Province of Cagayan, *For. Bur. 18539 Alvarez:* Province of Union, *Elmer 6166:* Province of Pampanga, *Merrill 1387, 1437, 3831, Topping 482, Villegas 453:* Province of Bulacan, *For. Bur. 7194, 7196 Curran:* Province of Rizal, *Merrill 1633, 2801, 2673, For. Bur. 1147, 2890 Ahern's collector, Decades Philip. Forest Fl. no. 156 Ahern's collector, Bur. Sci. 2178 Ramos, Topping 752.* MINDORO, *For. Bur. 9821 Merritt.*

Native names: *Baloc, baloc-baloc* (Rizal); *bani, malabay* (Pampanga).

An endemic species, common at low altitudes; according to Prain, *in lit.*, very closely allied to *M. decipiens* Prain of the Malay Peninsula.

5. **Millettia cavitensis** sp. nov. § *Eumillettia.*

Arbor glabra circiter 8 m alta; foliis imparipinnatis, usque ad 20 cm longis; foliolis 2- vel 3-jugatis, ovatis, oblongo-ovatis, vel elliptico-ovatis, submembranaceis vel chartaceis, basi rotundatis vel subacutis, apice valde acuminatis, utrinque nitidis; racemis elongatis, foliis subaequilongis, multifloris; floribus atropurpureis, 2 cm longis.

A glabrous tree about 8 m high. Branches terete, rather slender, gray or brownish, sometimes lenticellate. Leaves odd-pinnate, 16 to 20 cm long. Leaflets 2- or 3-jugate, ovate, oblong-ovate, or elliptic-ovate, 6 to 10 cm long, 2 to 4 cm wide, submembranaceous or chartaceous, shining on both surfaces, the base rounded or subacute, the apex rather strongly and slenderly acuminate; nerves about 5 on each side of the midrib, somewhat ascending, not prominent, very obscurely anastomosing, the ultimate reticulations very fine, dense; petiolules 3 to 5 mm long. Racemes solitary, in the upper axils, about 15 cm long, many-flowered. Flowers dark-purple, their pedicels slender, 1 to 1.2 cm long. Calyx cup-shaped, truncate, about 6 mm high, 7 to 8 mm in diameter. Standard somewhat pubescent outside, about 22 mm long, 16 mm wide, broadly ovate, the apex broad, rather strongly cleft, the base of the lamina with two cartilaginous callosities 2 mm wide and 1 mm long, the claw stout, 4 mm long. Ovary rather distinctly pubescent, containing about 6 ovules. Vexillary filament free at the base, then united with the others for about two-thirds its length. Pods (immature) 10 cm long, 1.5 cm wide, flat, somewhat wrinkled, gradually narrowed toward the base, the apex strongly acuminate, the acumen curved.

Luzon, Province of Cavite, Maragondong, *Merrill 4181*, July, 1905, in forested ravines along a small stream, altitude about 250 m.

Manifestly allied to the preceding species, differing in its less numerous, larger, more strongly acuminate leaflets, and by having flowers twice as large.

6. **Millettia foxworthyi** sp. nov. § *Eumillettia.*

Arbor glabra circiter 15 m alta; foliis imparipinnatis, circiter 8 cm longis; foliolis 3-jugatis, oblongo-ellipticis, chartaceis, 2 ad 4 cm longis, acutis vel obscure acuminatis, subtus pallidioribus; racemis axillaribus, foliis subaequalibus vel brevioribus; floribus circiter 1.5 cm longis.

A glabrous tree about 15 m high. Branches reddish-brown, lenticellate. Leaves odd-pinnate, about 8 cm long; leaflets 2- or 3-pinnate, oblong-elliptic, chartaceous, 2 to 4 cm long, 1.2 to 1.7 cm wide, the base acute or rounded, the apex acute or somewhat acuminate, the lower surface much paler than the upper, both dull or only slightly shining when dry; nerves about 5 on each side of the midrib, not distinct, the reticulations subobsolete; petiolules about 4 mm long. Racemes in the upper axils, shorter than the leaves, rather many-flowered. Flowers

light-purple, their pedicels about 8 mm long. Calyx cup-shaped, truncate, about 4 mm high. Standard elliptic-obovate, about 1.5 cm long, 1.2 cm wide, slightly pubescent outside, the apex rounded, somewhat cleft, the basal callosities prominent, subcartilaginous, 2.5 to 3 mm wide, 1 mm high, the claw stout, about 2 mm long. Vexillary filament free at the base, then united with the rest for most of its length. Ovary glabrous, or with a very few scattered hairs.

PALAWAN, Mount Victoria, *Bur. Sci. 740 Foxworthy,* March, 1906, along river banks, altitude about 250 m.

As to the genus, Prain[38] calls attention to the fact that F. von Mueller has shown that *Millettia* is not distinct from *Wistaria,* and that Otto Kuntze[39] has proposed the adoption of *Phaseoloides* Mill., in the modified form *Phaseolodes,* to include the various species of both *Millettia* and *Wistaria.* This is, however, inadmissible under generally accepted rules, as Miller's name is pre-Linnean, dating from 1737, and seems not to have been used in the interval. *Kraunhia* Raf. (1809), is noted by Prain as the earliest unobjectional name, but this was excluded by the Vienna Botanical Congress in favor of *Wistaria.* Small[40] has taken up the name *Bradlea* Adans. (1763), for the American species of *Wistaria,* but it seems doubtful if this suggestion will meet with general approval. Under the Vienna rules, *Wistaria* Nutt. (1816), which is older than *Millettia* W. & A. (1834), would be the proper name for the species now placed in *Millettia,* if the two genera are to be combined. Pending a revision of the entire group, *Millettia* is retained.

EXCLUDED SPECIES.

MILLETTIA PULCHRA Benth.; F.-Vill. Nov. App. (1880) 59.

MILLETTIA SERICEA W. & A.; F.-Vill. l. c.

MILLETTIA SPLENDENS W. & A.; F.-Vill. l. c.

None of the above species are definitely known from the Philippines, and all were doubtless admitted on erroneous identifications on the part of F.-Villar.

39. GLIRICIDIA H. B. K.

1. **Gliricidia sepium** (Jacq.) Steud. Nomencl. (1821) 688; Urban Symbol. Antill. **2** (1900) 288; Perk. Frag. Fl. Philip. (1904) 17; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64.

Robinia sepium Jacq. Enum. (1760) 28.

Gliricidia maculata H. B. K. Nov. Gen. **6** (1823) 393, in nota, ex Ind. Kew.; F.-Vill. Nov. App. (1880) 59; Merr. in Forestry Bureau (Philip.) Bull. 1 (1903) 22.

Galedupa pungam Blanco Fl. Filip. (1837) 558, ed. 2 (1845) 390, ed. 3, **2**: 352, Naves l. c. ed. 3, *pl. 250,* non Gmel.

Millettia ? luzonensis A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 456; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 82.

Millettia splendidissima Vid. Cat. Pl. Prov. Manila (1880) 25, non Bl.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2314 Mearns, For. Bur. 14690 Darling:* Province of Zambales, *Merrill 2913:* Province of Laguna, *For. Bur.*

[38] Journ. As. Soc. Beng. **66** [2] (1897) 86.

[39] Rev. Gen. Pl. (1891) 201.

[40] Fl. Southeastern U. S. (1903) 612, as *Bradleia.*

10089 Curran: Manila, *Merrill Decades Philip. Forest Fl. 289:* Province of Bataan, *Ahern 767, For. Bur. 2593 Meyer, Merrill 1523:* Province of Rizal, *For. Bur. 2464 Ahern's collector:* Province of Tayabas, *Merrill 1913, For. Bur. 6596 Kobbe.* MINDORO, *Merrill 894, For. Bur. 8532 Merritt.* PALAWAN, *For. Bur. 3607 Curran, Bur. Sci. 263 Bermejos.* GUIMARAS, *For. Bur. 294 Gammill.* BOHOL, *Bur. Sci. 1237 McGregor.* MINDANAO, *Ahern 309.*

Native names: *Madre cacao; cacauate,* the former of Spanish, the latter of Mexican origin.

A native of tropical America, introduced into the Philippines in the eighteenth century, according to F.-Villar, and now cultivated and subspontaneous more or less throughout the Archipelago; very abundant in many provinces and islands.

40. **SESBANIA** Scop.

Flowers small, bud straight; annual suffrutescent herbs (§ EUSESBANIA).

Flowers 2 cm long; pod twisted, pendulous ..... 1. *S. roxburghii*

Flowers 1 cm long; pod not twisted, usually ascending..... 2. *S. cannabina*

Flowers large, 7 to 8 cm long, the buds falcately recurved; pod not twisted, pendulous (§ AGATI) ..... 3. *S. grandiflora*

1. **Sesbania roxburghii** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 269.

Aeschynomene paludosa Roxb. Hort. Beng. (1814), nomen, Fl. Ind. 3 (1832) 333, non *Sesbania paludosa* Jacq.

Coronilla emerus Blanco Fl. Filip. (1837) 582, non Linn.

Sesbania paludosa Prain in Journ. As. Soc. Beng. 66[2] (1897) 82, 367, non Jacq.

Sesbania cannabina Blanco Fl. Filip. ed. 2 (1845) 418, ed. 3, 2: 400, non Pers.

Sesbania grandiflora Miq. Fl. Ind. Bat. 1[1] (1855) 288, non Pers.

Sesbania cochinchinensis Kurz in Journ. As. Soc. Beng. 45[2] (1876) 271, non DC.

Sesbania aculeata var. *paludosa* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 115, in part, and excluding the synonym *Aeschynomene uliginosa.*

Sesbania aculeata F.-Vill. Nov. App. (1880) 59, non Pers.

LUZON, Province of Laguna, *Bur. Sci. 6530 Robinson, For. Bur. 10098 Curran,* in shallow water in Lake Bay.

Native names: *Balacla* (Laguna); *malacaguios,* ex Blanco.

Bengal to Burma, southern China, Formosa, and Java.

2. **Sesbania cannabina** (Retz.) Pers. Syn. 2 (1807) 316; DC. Prodr. 2 (1825) 265; Prain in Journ. As. Soc. Beng. 66[2] (1897) 83, 368.

Aeschynomene cannabina Retz. Obs. 5 (1789) 26.

Agati cannabina Desv. Journ. Bot. 1 (1813) 120.

Sesbania aegyptiaca F.-Vill. Nov. App. (1880) 59; Naves in Blanco Fl. Filip. ed. 3, *pl. 405,* non Pers.

Sesbania aculeata F.-Vill. l. c. 59, non Pers.

Sesbania picta Vid. Cat. Pl. Prov. Manila (1880) 26, non Pers.

LUZON, Province of Isabela, *Bur. Sci. 8086 Ramos:* Province of Ilocos Norte, *Bur. Sci. 2233 Mearns, Bur. Sci. 7648 Ramos:* Province of Ilocos Sur, *For. Bur. 15695 Merritt & Darling:* Province of Union, *Fénix 2:* Province of Pangasinan, *Alberto 28, Bur. Sci. 4850 Ramos:* Province of Pampanga, *Merrill 1444:* Manila, *Burgos 57, McGregor 73:* Province of Rizal, *Bur. Sci. 1370 Ramos:* Province of Laguna, *Elmer, Hallier s. n.* MINDANAO, District of Cotabato, *For. Bur. 3938 Hutchinson.*

Native names: *Rubao* (Union); *balacbac* (Rizal); *bayacbac-buquit* (Pampanga).

India to Burma, the Malay Peninsula and Java.

3. **Sesbania grandiflora** (Linn.) Pers. Syn. **2** (1807) 316; Blanco Fl. Filip. (1837) 599, ed. 2 (1845) 418, ed. 3, **2**: 399; Naves l. c. *pl. 291;* Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 115; F.-Vill. Nov. App. (1880) 60; Vidal Sinopsis Atlas (1883) *t. 40, fig. F.;* Perk. Frag. Fl. Philip. (1904) 17.

Robinia grandiflora Linn. Sp. Pl. (1753) 722.

Aeschynomene grandiflora Linn. l. c. ed. 2 (1763) 1060.

Sesban grandiflorus Poir. in Lam. Encycl. **7** (1806) 127.

Agati grandiflora Desv. Journ. Bot. **1** (1813) 120, *t. 4, fig. 6;* Miq. Fl. Ind. Bat. **1**[1] (1855) 289; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. **9** (1905) 175.

LUZON, Province of Cagayan, *Bur. Sci. 16464 Bacani:* Province of Union, *Elmer 5667:* Province of Nueva Vizcaya, *Merrill 166:* Province of Pangasinan, *For. Bur. 8404 Curran & Merritt, Bur. Sci. 4939 Ramos:* Manila, *Merrill 647, Decades Philip. Forest Fl. no. 55, Katigbak 241:* Province of Tayabas, *For. Bur. 10336 Curran, Merrill 1895.* GUIMARAS, *For. Bur. 98 Ritchie.* MINDANAO, *Mrs. Clemens 313, Williams 2694.*

Universally known in the Tagalog Provinces as *caturay,* in the Ilocano Provinces as *catuday; gawi-gawi* (Guimaras).

Widely distributed in the Philippines in and about towns, the flowers eaten as a salad and cooked as a pot herb; probably not a true native of the Philippines. Mascarene Islands through India and Malaya to northern Australia; usually planted.

The name *Sesbania* is not the oldest one for this genus, and it is not included in the list of *nomina conservanda* of the Vienna Botanical Congress. At the risk of being considered inconsistent, I have, however, retained it for the present work. Otto Kuntze[41] has adopted the generic name *Emerus* Burm. (1737) for all species usually known as *Sesbania,* but this is inadmissable under all generally accepted rules. In 1763 Adanson proposed two generic names for the species now included in *Sesbania,* the first, having page priority, *Sesban,* which was later changed to *Sesbania* by Scopoli, and the second *Agati,* which was based on *Robinia grandiflora* Linn. The latter name was taken up by Desvaux in 1813, with four species, *A. cannabina* Desv., *A. coccinea* Desv., *A. grandiflora* Desv., and *A. virgata* Desv., in which he has been followed by some recent authors. Small[42] considers *Sesban* and *Agati* to be generically distinct. If strict priority, limited by the date 1753, is to be observed, *Sesban* would then be the proper generic name, in case a single genus is recognized; if two genera are recognized, then *Sesban* would be the proper name for the small-flowered species (§ *Eusesbania*), and *Agati* the proper generic name for the large-flowered species (§ *Agati*).

41. CLIANTHUS Banks & Soland.

1. **Clianthus binnendyckianus** Kurz in Journ. As. Soc. Beng. **40**[2] (1871) 51; Koord. Meded. 's Lands Plantent. **19** (1908) 429; Perk. Frag. Fl. Philip. (1904) 20.

MINDANAO, Province of Surigao, *Bolster 381:* Lake Lanao, *Mrs. Clemens 548, 623, s. n.:* District of Davao, *Williams 2745.* POLILLO, *Bur. Sci. 10767 McGregor.*

Celebes and (?) Ceram.

The genus has three known species, two belonging in the subgenus *Euclianthus,* in Australia, and the above species constituting the subgenus *Pseudoclianthus.*

[41] Rev. Gen. Pl. (1891) 180.

[42] Fl. Southeastern U. S. (1903) 614.

The generic name *Donia* G. Don, has page priority over *Clianthus*, both genera having been published in the same work; the latter is retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

42. ORMOCARPUM DC.

1. **Ormocarpum cochinchinense** (Lour.) comb. nov.
Diphaca cochinchinensis Lour. Fl. Cochinch. (1790) 454.
Hedysarum sennoides Willd. Sp. Pl. **3** (1800) 1207.
Ormocarpum sennoides DC. Prodr. **2** (1825) 315; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 152; F.-Vill. Nov. App. (1880) 60; Vidal Rev. Pl. Vasc. Filip. (1886) 106; Perk. Frag. Fl. Philip. (1904) 17.

LUZON, Province of Ilocos Sur, *For. Bur. 5631 Klemme:* Province of Ilocos Norte, *For. Bur. 13956 Merritt & Darling.*

India, Ceylon, tropical Africa; Siam, southern China, Malaya to northern Australia and Polynesia.

Ormocarpum DC. (1825) is antedated by *Diphaca* Lour. (1790), so far as the generic name is concerned, but the former is in the list of *nomina conservanda* of the Vienna Botanical Congress, and is here retained, although necessitating a change in the specific name according to strict priority. Loureiro cites Rumphius' Herbarium Amboinense, **3** (1743) 200, *t. 128*, but the figure apparently represents *Ormocarpum glabrum* T. & B. rather than *O. cochinchinense*. O. Kuntze[43] has taken up Rumphius' name *Solulus* for the species generally known as *Ormocarpum*, but this is inadmissable under all generally accepted rules.

43. AESCHYNOMENE Linn.

1. **Aeschynomene indica** Linn. Sp. Pl. (1753) 713; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 151; Vid. Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 106.

Aeschynomene aspera Vogel in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 26, non Linn.

Aeschynomene roxburghii Spreng.; Llanos Fragm. (1851) 83.

LUZON, Province of Pampanga, *Merrill 4235:* Manila, *Merrill 3410, Hernandez 49:* Province of Rizal, *Bur. Sci. 1423 Ramos.* POLILLO, *Bur. Sci. 9024 Robinson.*

A common and widely distributed weed in wet lands, rice paddies, etc.; widely distributed in the tropics, especially in the Old World.

I have seen the Philippine specimen in the Berlin Herbarium determined by Vogel as *A. aspera*, and consider it to be rather *A. indica*.

44. SMITHIA Ait.

Calyx rigid, its veins close, parallel, simple, its lips acute, with few scattered hairs; flowers yellow ..... 1. *S. sensitiva*
Calyx membranaceous, its veins not close and parallel, anastomosing, the upper lip truncate, very broad, prominently ciliate-bristly; flowers pale-blue. 2. *S. ciliata*

1. **Smithia sensitiva** Ait. Hort. Kew. **3** (1789) 496; DC. Prodr. **2** (1825) 323; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 148; Perk. Frag. Fl. Philip. (1904) 18.

Damapana sensitiva O. Kuntze Rev. Gen. Pl. (1891) 179.

LUZON, Province of Benguet, *Williams 969, 1277, Bur. Sci. 5533, 5928 Ramos,*

[43] Rev. Gen. Pl. (1891) 205.

Elmer 6374, Merrill 4393, Bur. Sci. 8764 McGregor: Province of Nueva Vizcaya, *Merrill 111, 296, Bur. Sci. 8227 Ramos:* Province of Pangasinan, *Alberto 79, Bur. Sci. 4902, 4895 Ramos.* MINDANAO, Lake Lanao, *Mrs. Clemens 871.*

In the Philippines mostly at medium altitudes, usually in damp open places; tropical Asia and Africa to China and Formosa, Andaman and Nicobar Islands, and Java.

2. **Smithia ciliata** Royle Ill. (1839) 201, *t. 35, fig. 2;* Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 150; C. B. Robinson in Philip. Journ. Sci. **3** (1908) 184.

Damapana ciliata O. Kuntze Rev. Gen. Pl. (1891) 179.

LUZON, Province of Benguet, *Williams 970, Merrill 4267, Bur. Sci. 5890 Ramos, Bur. Sci. 2502 Mearns.*

In the Philippines growing on dry open slopes in the pine region of northern Luzon; India, Formosa.

Baker states that this species has yellow flowers, but having noted that the Philippine specimens, identified at Kew, and the New York Botanical Garden as *Smithia ciliata,* all had blue flowers, I wrote to Doctor Prain asking that the material be reëxamined, and am indebted to him for the following report made by Mr. Craib: "Royle in his original description (Illustrations of the Botany of the Himalayan Mountains, p. 201) says nothing about the color of the corolla. In a note, however, he says that he is indebted to Mr. W. Saunders for the drawing published. So it appears that up to the time of publication of the work quoted, Royle had not himself seen a living specimen of the plant.

"The following is extracted from manuscript notes on the species cover in the Kew Herbarium: 'The corolla in this plant varies from bluish to whitey-blue nearly white, *never* yellow (as Royle has painted it) copied in the Flora of British India' [signed] C. B. Clarke, Oct., 1899.

"The specimen quoted (Merrill 4267) was correctly identified at Kew as *Smithia ciliata* Royle."

The oldest valid generic name is *Damapana* Adans. (1763), but *Smithia* Ait. (1789) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

45. ARACHIS Linn.

1. **Arachis hypogæa** Linn. Sp. Pl. (1753) 741; Blanco Fl. Filip. (1837) 567, ed. 2 (1845) 396, ed. 3, **2**: 363; Naves l. c. *pl. 157;* Miq. Fl. Ind. Bat. **1**[1] (1855) 281; F.-Vill. Nov. App. (1880) 60.

LUZON, Province of Tarlac, *Dizon 364:* Province of Pampanga, *Feliciano 273:* Province of Rizal, *Loher 2409:* Province of Tayabas, *Merrill 4010.*

Commonly cultivated in the Philippines and in tropical and subtemperate parts of the world. Universally known in the Philippines as *maní.* The peanut.

46. ZORNIA Gmel.

1. **Zornia diphylla** (Linn.) Pers. Syn. **2** (1807) 318; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 147; F.-Vill. Nov. App. (1880) 60; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

Hedysarum diphyllum Linn. Sp. Pl. (1753) 747.

Lupinus angustifolius Blanco Fl. Filip. (1837) 566, non Linn.

Smithia bigeminata Blanco l. c. ed. 2 (1845) 395, ed. 3, **2**: 362.

Zornia nuda Vog. in Linnaea **10** (1836) 587.

LUZON, Province of Cagayan, *For. Bur. 16609, 16938 Curran:* Province of Abra, *Bur. Sci. 7235 Ramos:* Province of Benguet, *Williams 1421:* Province of

Zambales, *For. Bur. 5863 Curran:* Province of Bulacan, *Yoder 127:* Province of Rizal, *Bur. Sci. 1846:* Province of Bataan, *Merrill 3787, Williams 80.*

In open grass-lands at low and medium altitudes in the Philippines; cosmopolitan in the tropics.

47. DESMODIUM Desv.

Leaves 3-foliolate.

Pod distinctly divided into several 1-seeded joints which ultimately separate.

Bracts large, orbicular, persistent, foliaceous, inclosing the flowers; an erect shrub ..... 1. *D. pulchellum*

Bracts very small or none.

Flowers arranged in axillary or panicled umbels; shrubs or small trees.

Umbels axillary; leaflets broad at the apex, round, obtuse or very obscurely and broadly acuminate.

Leaflets small, 1 to 1.8 cm long ..... 2. *D. cumingianum*

Leaflets ample, mostly 5 to 10 cm long ..... 3. *D. umbellatum*

Umbels arranged in terminal or axillary panicles; leaflets gradually narrowed upward to the acuminate or acute apex. 4. *D. quinquepetalum*

Flowers not umbellate; shrubs or herbs.

Pods not sinuate, the segments indehiscent, 3 to 5 times as long as broad.

Erect, suffrutescent; leaflets ovate, ample, 7 to 15 cm long, acute or acuminate ..... 5. *D. laxiflorum*

Herbaceous, spreading; leaflets small, 2 to 4 cm long, or in luxuriant forms rarely 6 cm long, elliptic, obtuse, rounded, or retuse. 6. *D. scorpiurus*

Segments of the pods dehiscent or indehiscent, not manifestly longer than broad, or if so, then deeply sinuate.

Pods not stipitate, the segments indehiscent, as broad as long, spirally twisted, both sutures deeply indented; herbaceous. 8. *D. procumbens*

Pods stipitate, the segments longer than broad, the upper suture straight, the lower very deeply sinuate, the constrictions reaching nearly to the upper suture; shrubby.

Leaves quite glabrous; pod long exserted, its stipe usually much longer than the first segment ..... 9. *D. laxum*

Leaves more or less pubescent; stipe shorter than the first segment.

Flowers 8 to 10 mm long; pods with 2 to 4 joints.... 10. *D. scalpe*

Flowers 3 to 4 mm long; pods with 1 or 2 joints. 11. *D. podocarpum*

Pods not stipitate; both sutures slightly indented; calyx-teeth short, deltoid; shrubs.

Plant rather strongly pubescent; leaflets rhomboid-ovate, repand; pod with from 8 to 12 joints ..... 12. *D. sinuatum*

Plant only slightly pubescent; leaflets elliptic-oblong, entire; pod with 4 joints ..... 13. *D. bolsteri*

Pods not stipitate; upper suture straight, the lower deeply indented; herbaceous ..... 14. *D. malacophyllum*

Pods not stipitate, the segments as long as broad, the upper suture straight, the lower slightly sinuate, dehiscent.

Racemes dense in both flower and fruit; shrubby, erect or prostrate plants.

Leaflets obovate-cuneate, silvery-pubescent beneath; pedicels always ultimately reflexed; prostrate ..... 15. *D. capitatum*
Leaflets obovate-oblong or obovate-elliptic; pedicels erect or ascending; stems erect ..... 16. *D. heterocarpum*
Racemes lax in both flower and fruit; leaflets 1 to 2.5 or 3 cm long, retuse; spreading or ascending herbs..... 17. *D. buergeri*
Pods not stipitate, slightly sinuate on both sutures or straight on the upper; trailing or prostrate herbs with small leaves.
Flowers 1 to 3 in the axils of the leaves, with no common peduncle.
Pedicels shorter than or hardly exceeding the petioles; leaflets obovate-cuneate, truncate or emarginate; branches glabrescent ..... 20. *D. triflorum*
Pedicels manifestly exceeding the petioles; leaflets oblong, usually rounded at the apex; branches pubescent with spreading hairs ..... 21. *D. heterophyllum*
Flowers in terminal or axillary racemes; leaflets minute, 8 mm long or less ..... 22. *D. microphyllum*
Pods indistinctly jointed, dehiscing in a continuous line along the lower suture; erect undershrubs.
Pods glabrous ..... 23. *D. gyrans*
Pods copiously pubescent ..... 24. *D. gyroides*
Leaves 1-foliolate.
Petioles winged.
Erect, 1 to 2 m high; leaflet at least three times as long as the petiole; pods appressed-hirsute ..... 25. *D. triquetrum*
Branches prostrate, spreading from the woody root; leaflet about twice as long as the petiole; pods ciliate on the margins, otherwise glabrous.
26. *D. pseudotriquetrum*
Petioles not winged.
Segments of the pod 1 to 1.5 cm long, many times longer than broad.
7. *D. ormocarpoides*
Segments of the pod short, not manifestly longer than broad.
Leaflets ovate to oblong-ovate, narrowed to the acute or acuminate apex.
Petioles less than 5 mm long; racemes dense; pods pubescent.
27. *D. virgatum*
Petioles 1 to 2.5 cm long.
Racemes elongated, lax, simple or panicled; pods glabrescent.
28. *D. gangeticum*
Racemes short, simple; pods pubescent with spreading hairs.
19. *D. ovalifolium*
Leaflets orbicular to orbicular-ovate, apex broad.
Leaflets not reflexed; racemes elongated, equaling or exceeding the leaves.
29. *D. lasiocarpum*
Leaflets reflexed; racemes much shorter than the leaves.
18. *D. retroflexum*

§ Phyllodium.

1. **Desmodium pulchellum** (Linn.) Benth. Fl. Hongk. (1861) 83; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 162; F.-Vill. Nov. App. (1880) 61; Vidal Rev. Pl. Vasc. Filip. (1886) 107; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

Hedysarum pulchellum Linn. Sp. Pl. (1753) 747; Blanco Fl. Filip. (1837) 581.

Zornia pulchella Pers. Syn. **2** (1807) 318.

Dicerma pulchellum DC. Ann. Sci. Nat. I **4** (1825) 236, Prodr. **2** (1825) 339; Blanco Fl. Filip. ed. 2 (1845) 407, ed. 3, **2**: 383.

Phyllodium pulchellum Desv. Mém. Soc. Linn. Paris 4 (1826) 324; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 431; Miq. Fl. Ind. Bat. 1[1] (1855) 260.

Meibomia pulchella O. Kuntze Rev. Gen. Pl. (1891) 197.

LUZON, Province of Ilocos Norte, *For. Bur. 15524 Merritt & Darling:* Province of Union, *For. Bur. 15709 Merritt & Darling:* Province of Benguet, *Topping 55:* Province of Bataan, *Williams 68, Merrill 3310, Copeland 292, For. Bur. 2185 Meyer:* Province of Rizal, *For. Bur. 1973 Ahern's collector, Merrill 2710, Decades Philip. Forest Fl. 252 Ahern's collector:* Province of Batangas, *Katigbak 280.* CULION, *Merrill 438.* PALAWAN, *Bur. Sci. 201 Bermejos.* MINDANAO, *Mrs. Clemens 748.* BASILAN, *DeVore & Hoover 80.*

Native names: *Payang-payang* (Rizal); *calaicai,* ex Blanco (Visayan).

Widely distributed in the Philippines, especially at low altitudes; Ceylon and India to southern China and Formosa, southward through Malaya to New Guinea and the Bismarck Archipelago.

Desmodium elegans (Lour.) Benth., is said by Hemsley[44] to extend from southern China to Cochin-China, Java, and the Philippines. I have, however, seen no Philippine specimens that I consider as referable to this species, and the extension of range of *D. elegans* to the Archipelago may have been based on an erroneously identified specimen of *D. pulchellum.*

§ DENDROLOBIUM.

2. **Desmodium cumingianum** (Benth.) Benth. & Hook. f. ex F.-Vill. Nov. App. (1880) 61; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 107.

Dendrolobium cumingianum Benth. Pl. Jungh. (1852) 216; Miq. Fl. Ind. Bat. 1[1] (1855) 263.

LUZON, Province of Batangas, *Cuming 1454.*

This endemic species has not been rediscovered since Cuming's time. The locality is taken from Cuming's own list at Kew. It is manifestly allied to *D. umbellatum,* but at the same time quite distinct from that species.

3. **Desmodium umbellatum** (Linn.) DC. Prodr. 2 (1825) 325; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 161; Vid. Sinopsis Atlas (1883) *t. 41, fig. D,* Rev. Pl. Vasc. Filip. (1886) 106; F.-Vill. Nov. App. (1880) 61.

Hedysarum umbellatum Linn. Sp. Pl. (1753) 747.

Aeschynomene arborea Blanco Fl. Filip. (1837) 581, ed. 2 (1845) 406, ed. 3, 2: 381.

Dendrolobium umbellatum W. & A. ex Benth. Pl. Jungh. (1852) 216; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 431; Miq. Fl. Ind. Bat. 1[1] (1855) 262.

Meibomia umbellata O. Kuntze Rev. Gen. Pl. (1891) 197.

BATANES ISLANDS, Sabtan, *Bur. Sci. 3745 Fénix, Bur. Sci. 10138 McGregor.* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4115 Fénix.* LUZON, Province of Zambales, *Hallier s. n., Merrill 2093:* Province of Bataan, *For. Bur. 2026 Borden, Decades Philip. Forest Fl. no. 141 Ahern's collector:* Province of Tayabas, *Gregory 95, For. Bur. 7477 Reyes, Whitford 698, 751:* Province of Camarines, *Ahern 222.* MINDORO, *For. Bur. 5396, 9675 Merritt, Merrill 2257.* CULION, *Merrill 550.* PALAWAN, *For. Bur. 3531, 3777 Curran.* TABLAS, *McGregor 338.* BOHOL, *Bur. Sci. 1263 McGregor.* TICAO, *For. Bur. 1058, 2531 Clark.* MASBATE, *Merrill 3036.* LEYTE, *For. Bur. 12449 Danao.* MINDANAO, *Mrs. Clemens 1199, Copeland 625, 1326, Ahern 408, DeVore & Hoover 212.* BASILAN, *For. Bur. 3468 Hutchinson.*

[44] Journ. Linn. Soc. Bot. 23 (1887) 171.

Native names: *Malacarios* (Zambales); *nagtan-urang* (Masbate); *miagos* (Ticao); *cabay-cabay* (Tayabas).

Along the seashore throughout the Philippines; from the Mascarene Islands through India, southern China, Malaya, northern Australia and Polynesia.

4. **Desmodium quinquepetalum** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 20.

Cytisus quinquepetalus Blanco Fl. Filip. (1837) 598.

Glycine cajanoides Walp. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 324; F.-Vill. Nov. App. (1880) 62.

Cajanus quinquepetalus Blanco Fl. Filip. ed. 2 (1845) 417, ed. 3, **2**: 397.

Desmodium cephalotes F.-Vill. Nov. App. (1880) 61, non Wall.

LUZON, Province of Abra, *Bur. Sci. 7256 Ramos:* Province of Ilocos Norte, *For. Bur. 13819, 13912, 13960, 15521 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 5259 Klemme:* Province of Benguet, *For. Bur. 14118 Merritt & Darling, Williams 930, Bur. Sci. 5573 Ramos:* Province of Nueva Ecija, *Bur. Sci. 5270 McGregor:* Province of Zambales, *Bur. Sci. 5122 Ramos, For. Bur. 5808, 6963, 6958 Curran:* Province of Pangasinan, *Bur. Sci. 4909 Ramos:* Province of Pampanga, *For. Bur. 9613 Zschokke:* Province of Bulacan, *Yoder 113:* Province of Rizal, *For. Bur. 1841, 2154, 3296 Ahern's collector, Bur. Sci. 1498 Ramos.* Without locality (*Vidal 245, 246, 247, 1063; Loher 2368, 2369, 2370*) in Herb. Kew. *fide* Prain in lit.

Native names: *Pangardisan, pangaldisan* (Ilocos, Benguet); *payispis, baquisquis* (Rizal).

Widely distributed in Luzon at low and medium altitudes in open thickets; endemic. I have examined the type of *Glycine cajanoides* Walp. in the Berlin herbarium and find that it is identical with the above species.

§ SCORPIURUS.

5. **Desmodium laxiflorum** DC. Prodr. **2** (1825) 335; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 164; F.-Vill. Nov. App. (1880) 61; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

Desmodium recurvatum Grah. in Wall. Cat. (1832) no. 5717; Benth. Pl. Jungh. (1852) 225.

Meibomia laxiflora O. Kuntze Rev. Gen. Pl. (1891) 196.

LUZON, Province of Ilocos Sur, *For. Bur. 15685 Merritt & Darling:* District of Lepanto, *Merrill 4464:* Province of Benguet, *For. Bur. 14411 Darling, Merrill 4394:* Province of Bataan, *For. Bur. 2218 Meyer, Williams 269:* Province of Laguna, *Hallier s. n., Bur. Sci. 6025, 6090 Robinson:* Province of Rizal, *Loher 2363, Merrill 1348, For. Bur. 1976 Ahern's collector:* Province of Bulacan, *Yoder 27.* PALAWAN, *Bur. Sci. 239 Bermejos.* TICAO, *For. Bur. 12556 Rosenbluth.* NEGROS, *For. Bur. 5608 Everett.* MINDANAO, *For. Bur. 9230 Whitford & Hutchinson.* BASILAN, *Hallier s. n.*

Native names: *Mangquit* (Rizal); *Manquit-labuyo* (Laguna).

Widely distributed in the Philippines in thickets and ravines from sea level to an altitude of at least 1,000 m; India to Formosa, the Malay Peninsula and Archipelago.

6. **Desmodium scorpiurus** (Sw.) Desv. Journ. Bot. **1** (1813) 122; DC. Prodr. **2** (1825) 333; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

Hedysarum scorpiurus Sw. Prodr. (1788) 107.

Meibomia scorpiurus O. Kuntze Rev. Gen. Pl. (1891) 198.

Batanes Islands, Batan, *Bur. Sci. 3699 Fénix.* Luzon, Province of Ilocos Norte, *Bur. Sci. 2242, 2253 Mearns:* Province of Ilocos Sur, *For. Bur. 15692 Merritt & Darling:* Province of Union, *Elmer 5635:* Province of Benguet, *Merrill 4274* (luxuriant form): Province of Laguna, *Bur. Sci. 6098 Robinson:* Province of Batangas, *Marave 164:* Manila, *Carlos 132, Mayor 54, Merrill 385, McGregor 78:* Province of Bataan, *Merrill 3101, Williams 291.* Mindoro, *Bur. Sci. 6645 Robinson.* Balabac, *Bur. Sci. 418 Mangubat.*

Widely distributed in the Philippines at low altitudes along trails, in open grass lands, thickets, etc.; introduced from tropical America.

In a letter written in 1906, Dr. C. B. Robinson states that a specimen from Formosa, *Henry 1176,* in the herbarium of the New York Botanical Garden, is the same as *Williams 291* and *Elmer 5635,* and that comparison with *D. scorpiurus* shows that the American material has consistently narrower leaflets than the Philippine, which is borne out by the single American specimen here, *Sintenis 2971* from Porto Rico.

7. **Desmodium ormocarpoides** (Desv.) DC. Prodr. **2** (1825) 327; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 164; F.-Vill. Nov. App. (1880) 61; Vidal Rev. Pl. Vasc. Filip. (1886) 108; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. **2** (1907) Bot. 276.

Hedysarum ormocarpoides Desv. ex DC. l. c. as syn.

Meibomia ormocarpodes O. Kuntze Rev. Gen. Pl. (1891) 198.

Luzon, Province of Tayabas, *Whitford 865.* Mindoro, *Merrill 6223.* Samar, *Merrill 5201.* Cebu, *Bur. Sci. 1731 McGregor.* Mindanao, Lake Lanao, *Mrs. Clemens 632.*

India to the Malay Peninsula and Java.

§ Chalarium.

8. **Desmodium procumbens** (Mill.) A. S. Hitchc. Rept. Mo. Bot. Gard. **4** (1893) 76.

Hedysarum procumbens Mill. Gard. Dict. ed. 8 (1768) no. 10.

Hedysarum spirale Sw. Prodr. (1788) 107.

Desmodium spirale DC. Prodr. **2** (1825) 332; Blanco Fl. Filip. ed. 2 (1845) 408, ed. 3, **2:** 385; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 164; F.-Vill. Nov. App. (1880) 61; Perk. Frag. Fl. Philip. (1904) 19.

Desmodium chamissonis Vog. in Linnaea **10** (1836) 588.

Hippocrepis rhomboidea Blanco Fl. Filip. (1837) 585.

Meibomia chamissonis & M. spiralis O. Kuntze l. c. 197.

Luzon, Province of Ilocos Norte, *Bur. Sci. 7623 Ramos:* Province of Ilocos Sur, *For. Bur. 15691 Merritt & Darling:* Province of Abra, *Bur. Sci. 7129 Ramos:* Province of Pangasinan, *Bur. Sci. 4877 Ramos:* Manila, *Merrill 836, Rosario 320.*

Widely distributed as a weed in waste places at low altitudes; tropics of the world, probably a native of tropical America.

§ Podocarpium.

9. **Desmodium laxum** DC. Ann. Sci. Nat. I **4** (1825) 102, Prodr. **2** (1825) 336; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 138.

Desmodium gardneri Benth. Pl. Jungh. (1852) 226; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 165.

Desmodium leptopus A. Gray ex Benth. l. c., Bot. Wilkes U. S. Explor. Exped.

(1854) 436; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 81, *pl. 1;* F.-Vill. Nov. App. (1880) 61; Miq. Fl. Ind. Bat. 1[1] (1855) 255.

Meibomia leptopus O. Kuntze Rev. Gen. Pl. (1891) 198.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4132 Fénix.* LUZON, Province of Benguet, *Elmer 6527, Williams 1409, For. Bur. 15913 Bacani:* Province of Laguna, *Wilkes Expedition,* in U. S. Nat. Herb.: Province of Nueva Vizcaya, *Bur. Sci. 8199 Ramos:* Province of Albay, *Bur. Sci. 6473 Robinson.* NEGROS, *Bur. Sci. 1152, 1163 Banks.* MINDANAO, Lake Lanao, *Mrs. Clemens 84, s. n.:* Province of Misamis, *For. Bur. 4768 Mearns & Hutchinson.*

India to Indo-China, China, the Malay Peninsula and Archipelago.

The Philippine material seems to have rather shorter articulations to the pods than has Asiatic material, but I do not consider the differences sufficient to warrant distinguishing *D. leptopus* from *D. laxum* (*D. gardneri* Benth.). Dr. Prain, *in lit.*, has identified *Elmer 6527* with *D. laxum* DC., stating that *D. gardneri* Benth. is the same as DeCandolle's species. For a full description of *D. laxum* DC. see Prain in King's Materials for a Flora of the Malayan Peninsula.[45]

10. **Desmodium scalpe** (Comm.) DC. Prodr. 2 (1825) 334; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 165; F.-Vill. Nov. App. (1880) 61.

Hedysarum scalpe Comm. ex DC. l. c. as syn.

LUZON, District of Lepanto, *For. Bur. 14493 Darling, For. Bur. 5676 Klemme:* Province of Benguet, *Elmer 5914, Merrill 4835, 4330, Williams 1126, Topping 60, Bur. Sci. 5357 Ramos, For. Bur. 15745 Curran & Merritt, For. Bur. 4937 Curran.*

In the Philippines apparently confined to the high tableland of north central Luzon; Africa, tropical Asia and Malaya.

11. **Desmodium podocarpum** DC. Ann. Sci. Nat. I 4 (1825) 102, Prodr. 2 (1825) 336; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 165; Forbes & Hemsley in Journ. Linn. Soc. Bot. 23 (1887) 174.

Meibomia podocarpa O. Kuntze Rev. Gen. Pl. (1891) 198.

LUZON, Province of Benguet, *Williams 1398, Merrill 4356.*

Northern India to China and Japan; not previously reported from the Philippines.

§ DOLLINERA.

12. **Desmodium sinuatum** (Miq.) Bl. ex Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 166.

Desmodium strangulatum var. *sinuatum* Miq. Fl. Ind. Bat. 1[1] (1855) 255.

Meibomia sinuata O. Kuntze Rev. Gen. Pl. (1891) 198.

LUZON, District of Lepanto, *Merrill 4642:* Province of Benguet, *Topping 61, Bur. Sci. 5458, 5563, 5791 Ramos, Williams 914, Bur. Sci. 4479, 3518 Mearns, For. Bur. 5130 Curran, For. Bur. 16034 Curran, Merritt, & Zschokke.* MINDANAO, Mount Apo, *DeVore & Hoover 315, 354.*

A species confined to high altitudes in the Philippines; India to southern China and Formosa, through Malaya to New Guinea. Not previously reported from the Philippines.

13. **Desmodium bolsteri** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 102.

LUZON, Province of Cagayan, Peña Blanca, *Bolster 181.*

Endemic.

[45] Journ. As. Soc. Beng. 66[2] (1897) 138.

§ Nicholsonia.

14. **Desmodium malacophyllum** (Link) DC. Prodr. **2** (1825) 338, (*malachophyllum*); F.-Vill. Nov. App. (1880) 62.

Hedysarum malacophyllum Link Enum. (1822) 247.

Meibomia malacophylla O. Kuntze Rev. Gen. Pl. (1891) 198.

Luzon, *Chamisso* in herb. Berol.

This species is only known from the type collection, and it is probable that Chamisso secured his material somewhere in Cavite Province, Luzon. I have examined the type, but from my notes and the short original description, was unable to determine with satisfaction the status of the species. Through the kindness of Dr. I. Urban, I have recently been again able to examine fragments of the type specimens, loaned to me for the purpose, as well as a sketch of the fruit made by Doctor Harms. Regarding the species, Doctor Harms, who has kindly reëxamined the type writes as follows: "Chamisso's type of *Desmodium malacophyllum* DC. in the Berlin Herbarium is entirely different from *D. laxiflorum* DC., a common species described in Hooker's 'Flora of British India' as having 'not at all or slightly constricted pods,' whereas in Chamisso's plant the pods are deeply indented on one suture, and nearly straight on the other. The leaflets in *D. laxiflorum* are acute, and in *D. malacophyllum* they are obtuse or subobtuse. *D. malacophyllum* seems to belong to the group of species included in Hook. f. Fl. Brit. Ind. II between nos. 28 and 32."

15. **Desmodium capitatum** (Burm.) DC. Prodr. **2** (1825) 336; Miq. Fl. Ind. Bat. **1**[1] (1855) 241; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 170; F.-Vill. Nov. App. (1880) 62; Vid. Phan. Cuming. Philip. (1885) 107; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

Hedysarum capitatum Burm. Fl. Ind. (1768) 167, *t. 64, fig. 1.*

Meibomia capitata O. Kuntze Rev. Gen. Pl. (1891) 195.

Luzon, Province of Pangasinan, *Bur. Sci. 4862, 4880 Ramos:* Province of Pampanga, *Bolster 43:* Province of Bataan, *Merrill 1559:* Province of Rizal, *Katigbak 225:* Province of Cavite, *Tirona 252:* Province of Laguna, *Hallier s. n.* Mindoro, *For. Bur. 5510, 5528 Merritt, Merrill 6224.* Mindanao, District of Cotabato, *Mrs. Clemens 789:* District of Davao, *Copeland 359, DeVore & Hoover 127, 192.* Basilan, *Hallier s. n.*

Native names: *Manimanihan* (Bataan); *mani-parang, mani-mani* (Mindoro). Ceylon and India to the Malay Peninsula and Archipelago.

16. **Desmodium heterocarpum** (Linn.) DC. Prodr. **2** (1825) 337; Trimen Fl. Ceyl. **2** (1894) 53.

Hedysarum heterocarpum Linn. Sp. Pl. (1753) 747.

Hedysarum polycarpon Poir. in Lam. Encycl. **6** (1804) 413.

Desmodium polycarpum DC. Prodr. **2** (1825) 334; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 171; F.-Vill. Nov. App. (1880) 62; Vid. Rev. Pl. Vasc. Filip. (1886) 107; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

Meibomia heterocarpa O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, District of Lepanto, *Merrill 4458:* Province of Benguet, *Williams 926:* Province of Ilocos Norte, *For. Bur. 12499 Merritt & Darling:* Province of Nueva Ecija, *Bur. Sci. 5269, 5295 McGregor:* Province of Bulacan, *Yoder 186:* Province of Rizal, *Bur. Sci. 1483 Ramos.* Polillo, *Bur. Sci. 6879 Robinson.* Negros, *For. Bur. 4318 Everett.* Samar, *Merrill 5221.* Mindanao, Province of Surigao, *Allen 140;* Lake Lanao, *Mrs. Clemens 368, s. n.*

Native names: *Mani-mani* (Negros); *manimanihan* (Polillo).

Widely distributed in the Philippines at low and medium altitudes; tropical Asia to Japan, Malaya to northern Australia and Polynesia; also in tropical Africa.

17. **Desmodium buergeri** Miq. Ann. Mus. Bot. Lugd.-Bat. **3** (1867) 45.

LUZON, Province of Benguet, *Williams 1400, 1402, Merrill 4374:* Province of Laguna, *Hallier s. n.* MINDANAO, Lake Lanao, *Mrs. Clemens s. n.*

This species was placed among the synonyms of *Desmodium heterocarpum* (*D. polycarpum*) by Baker, but the specimens here cited seemed so distinct from that species that request was made of Dr. J. K. Small for comparison of them with the collections in the herbarium of the New York Botanical Garden. He writes that "Williams' specimens nos. 1400 and 1402 agree exactly with specimens of *D. buergeri* from Japan. The latter species seems to be referred to *D. polycarpum*, but judging from apparently authentic material of *D. polycarpum* in our collection, I can not see why the two species are merged." *D. buergeri* is manifestly allied to *D. heterocarpum*, but differs from the typical forms of that species in its very diffuse habit, much smaller and differently shaped leaflets, and its lax racemes.

Japan.

18. **Desmodium retroflexum** (Linn.) DC. Prodr. **2** (1825) 336; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 170; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 176; Merr. in Philip. Journ. Sci. **4** (1909) 267.

Meibomia retroflexa O. Kuntze Rev. Gen. Pl. (1891) 197.

LUZON, Province of Nueva Ecija, *Bur. Sci. 5278 McGregor.*

Himalayan region to Tenasserim and southern China.

19. **Desmodium ovalifolium** Wall. Cat. (1832) no. 5730.

Desmodium polycarpum var. *ovalifolia* Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 141.

LUZON, Province of Bataan, Mount Mariveles, *Whitford 227, For. Bur. 3115 Meyer.*

Penang and Sumatra.

Doctor Prain, who has identified the above specimens, writes me that he considers *D. ovalifolium* to be a good species; it was reduced by Baker to *D. polycarpum* DC. (*D. heterocarpum* (L.) DC.).

§ SAGOTIA.

20. **Desmodium triflorum** (Linn.) DC. Prodr. **2** (1825) 334; Miq. Fl. Ind. Bat. **1**[1] (1855) 238; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 173; F.-Vill. Nov. App. (1880) 62; Vid. Rev. Pl. Vasc. Filip. (1886) 107; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 135.

Hedysarum triflorum Linn. Sp. Pl. (1753) 749.

Hippocrepis humilis Blanco Fl. Filip. (1837) 585.

Desmodium parvifolium Blanco l. c. ed. 2 (1845) 408, ed. 3, **2**: 386, non DC.

Meibomia triflora O. Kuntze Rev. Gen. Pl. (1891) 197.

LUZON, Province of Cagayan, *Bur. Sci. 7935, 7465 Ramos, For. Bur. 16610 Curran:* Province of Benguet, *Williams 1278:* Province of Bulacan, *Yoder 112:* Province of Bataan, *Whitford s. n., Williams 263:* Manila, *Garcia 55, Merrill 384, Elmer 5515.* POLILLO, *Bur. Sci. 10766 McGregor.* PANAY, *Yoder 7.* MINDANAO, *Copeland 403, DeVore & Hoover 203.*

Widely distributed in the Philippines at low altitudes; tropics of the world.

21. **Desmodium heterophyllum** (Willd.) DC. Prodr. **2** (1825) 334; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 173; F.-Vill. Nov. App. (1880) 62; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 135.

Hedysarum heterophyllum Willd. Sp. Pl. **3** (1800) 1201.
Meibomia heterophylla O. Kuntze Rev. Gen. Pl. (1891) 196.
LUZON, Province of Tayabas, *Merrill 1964.*
India to China, Malaya, and the Mascarene Islands.

Prain states that this species is rare in India and common in Malaya; but in the Philippines typical *Desmodium heterophyllum* appears to be rare, and *D. triflorum* common. I have seen but a single specimen that I consider referable to *D. heterophyllum* as construed by Prain.[46]

22. **Desmodium microphyllum** (Thunb.) DC. Prodr. **2** (1825) 337.
Hedysarum microphyllum Thumb. Fl. Jap. (1784) 284.
Desmodium parvifolium DC. Ann. Sci. Nat. I **4** (1825) 100, Prodr. **2** (1825) 334; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 174; F.-Vill. Nov. App. (1880) 62.
Meibomia microphylla O. Kuntze Rev. Gen. Pl. (1897) 198.
LUZON, Province of Benguet, *For. Bur. 15616 Curran, Bur. Sci. 5321 Ramos, Williams 1395, 1396, Bur. Sci. 4446 Mearns, Merrill 4305, Elmer 5849, For. Bur. 18153 Curran, Merritt, & Zschokke.* MINDANAO, Lake Lanao, *Mrs. Clemens 38.*
In the Philippines at medium and higher altitudes; India and Ceylon to China and Japan, southward through Malaya to New Guinea.

§ PLEUROLOBIUM.

23. **Desmodium gyrans** (Linn.) DC. Prodr. **2** (1825) 326; Baker in Hook. f. Fl. Ind. **2** (1876) 174; F.-Vill. Nov. App. (1880) 62; Vid. Rev. Pl. Vasc. Filip. (1886) 107.
Hedysarum gyrans Linn. f. Suppl. (1781) 332.
Meibomia gyrans O. Kuntze Rev. Gen. Pl. (1891) 196.
LUZON, Province of Cagayan, *Bur. Sci. 7922 Ramos:* Province of Nueva Vizcaya, *Bur. Sci. 8257 Ramos:* Province of Benguet, *Williams 920, 1407, Merrill 4277.*
India to Java and Sumatra, not reported from China or the Malay Peninsula, but found in Formosa.

24. **Desmodium gyroides** (Roxb.) DC. Prodr. **2** (1825) 326; Baker in Hook. f. Fl. Ind. **2** (1876) 175; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 145; Merr. & Rolfe in Philip. Journ. Sci. **3** (1908) Bot. 103.
Hedysarum gyroides Roxb. Hort. Beng. (1814) 57, nomen.
Meibomia gyrodes O. Kuntze Rev. Gen. Pl. (1891) 196.
MINDANAO, Lake Lanao, *Mrs. Clemens 369.*
India to southern China and Formosa southward through Malaya to New Guinea.

§ PTEROLOMA.

25. **Desmodium triquetrum** (Linn.) DC. Prodr. **2** (1825) 326; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 163; F.-Vill. Nov. App. (1880) 61; Perk. Frag. Fl. Philip. (1904) 19; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 143, 390.
Hedysarum triquetrum Linn. Sp. Pl. (1753) 746.
Pteroloma triquetrum Benth. Pl. Jungh. (1852) 220; Miq. Fl. Ind. Bat. **1**[1] (1855) 258.
Meibomia triquetra O. Kuntze Rev. Gen. Pl. (1891) 197.
CULION, *Merrill 519, Bur. Sci. 181 Bermejos.* A specimen from Rizal Province, Luzon, *Bur. Sci. 1036 Ramos,* is also probably referable here.

[46] Journ. As. Soc. Beng. **66**[2] (1897) 135.

Mascarene Islands, India, southern China, the Malay Peninsula and Archipelago to New Guinea and northern Australia.

26. **Desmodium pseudotriquetrum** DC. Ann. Sci. Nat. I 4 (1825) 100, Prodr. 2 (1825) 326.

Desmodium triquetrum subsp. *pseudotriquetrum* Prain in Journ. As. Soc. Beng. 66[2] (1897) 390.

Luzon, Province of Benguet, *Merrill 4477, Williams 1414.*

Northern India and the mountains of Assam.

This species was reduced by Baker to *D. triquetrum* DC., but its habit is entirely different, its leaves much smaller, and its pods glabrous, except for the ciliate margins. The two specimens cited above appear to be in all respects typical *D. pseudotriquetrum*, and I consider the form to be worthy of specific rank.

§ Heteroloma.

27. **Desmodium virgatum** Zoll. Nat. Geneesk. Arch. 3 (1846) 58; Prain in Journ. As. Soc. Beng. 66[2] (1897) 143, 399; Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 103.

Desmodium gangeticum Naves in Blanco Fl. Filip. ed. 3, *pl. 377*, non DC.

Desmodium latifolium var. *virgatum* Miq. Fl. Ind. Bat. 1[1] (1855) 247.

Luzon, Province of Rizal, *Bur. Sci. 4 Foxworthy:* Province of Bataan, *For. Bur. 2231 Meyer:* without locality, *Marave 155, Vidal 248* (Herb. Kew), *Loher 2348, 2349* (Herb. Kew).

This species was reduced to *Desmodium latifolium* DC. by Miquel, as a variety, and later by Baker was merged in the species; it is, however, entirely worthy of specific rank.

Chittagong to Burma, Perak and Java.

28. **Desmodium gangeticum** (Linn.) DC. Prodr. 2 (1825) 327; Miq. Fl. Ind. Bat. 1[1] (1855) 247; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 168; F.-Vill. Nov. App. (1880) 62.

Hedysarum gangeticum Linn. Sp. Pl. (1753) 746.

Desmodium gangeticum var. *neaei* DC. Prodr. 2 (1825) 327.

Hippocrepis comosa Blanco Fl. Filip. (1837) 584, non Linn.

Desmodium diversifolium Blanco l. c. ed. 2 (1845) 408, ed. 3, 2: 384, non DC.

Meibomia gangetica O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, Province of Cagayan, *For. Bur. 16767 Curran:* Province of Ilocos Norte, *Bur. Sci. 7641 Ramos:* Province of Benguet, *Williams 1406:* Province of Union, *Elmer 5671:* Province of Pangasinan, *Merrill 2872:* Province of Bulacan, *Yoder 46:* Manila, *McGregor 75, Baja 249:* Province of Cavite, *Bur. Sci. 1300 Mangubat:* Province of Rizal, *Bur. Sci. 6146 Robinson:* Province of Bataan, *Williams 52, Whitford 406, Elmer 6852, Merrill 3104:* Province of Tayabas, *Whitford 659, Gregory 119.* Mindoro, *Merrill 1269.* Palawan, *Merrill 849.* Guimaras, *For. Bur. 6479 Everett.* Bohol, *Miss Adams.* Basilan, *DeVore & Hoover 36.*

Native names: *Manquit* (Bataan); *payang-payàng* (Tayabas); *diquit-diquit* (Pangasinan); *pega-pega* (Basilan).

The variety *neaei* DC. Prodr. 2 (1825) 327, described from Philippine material, is not distinct from the species. The type has been kindly examined by Mr. C. DeCandolle at my request.

Widely distributed in the Philippines at low altitudes; tropical Africa and Asia to China, through Malaya to northern Australia and Polynesia; introduced in the West Indies.

29. **Desmodium lasiocarpum** (Beauv.) DC. Prodr. **2** (1825) 328.

Hedysarum lasiocarpum Beauv. Fl. Oware & Benin **1** (1804) 32, *t. 18;* Poir. in Lam. Encycl. Suppl. **5** (1817) 15.

Hedysarum latifolium Roxb. Hort. Beng. (1814) 57.

Desmodium latifolium DC. Prodr. **2** (1825) 328; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 168; F.-Vill. Nov. App. (1880) 62, excl. syn. Naves *pl. 372;* Vidal Rev. Pl. Vasc. Filip. (1886) 107.

Hippocrepis multisiliquosa Blanco Fl. Filip. (1837) 584.

Desmodium gangeticum Blanco l. c. ed. 2 (1845) 408, ed. 3, **2**: 384, non DC.

Meibomia lasiocarpa O. Kuntze Rev. Gen. Pl. (1891) 196.

LUZON, Province of Benguet, *For. Bur. 15915 Bacani, Williams 1405:* Province of Rizal, *Bur. Sci. 1833 Ramos, For. Bur. 2008 Ahern's collector:* Province of Laguna, *Hallier s. n.* MINDANAO, District of Zamboanga, *Merrill 5466.* NEGROS, *For. Bur. 13720 Curran.*

Tropical Africa and Asia to southern China and Formosa, through Malaya to New Guinea; introduced in the West Indies.

The specimens from Rizal Province sometimes have simple leaves, sometimes two leaflets, and sometimes three; the additional leaflets, when present, are very much smaller than the normal single one. The specimens are all manifestly referable to this species.

The Blancoan synonyms are referred here, and under *D. gangeticum*, above, after F.-Villar; the descriptions are too imperfect to be absolutely sure of the correctness of the identifications.

DOUBTFUL AND EXCLUDED SPECIES.

DESMODIUM PILOSIUSCULUM DC. Prodr. **2** (1825) 335.

The origin of the material on which this species was based is doubtful. DeCandolle says "in Philippicis ? (v. s. ex herb. Thibaud.)." Mr. C. DeCandolle has kindly supplied me with a photograph of the type; it is not matched by any recently collected Philippine material, nor among the extra-Philippine species represented in this Herbarium. Mr. C. DeCandolle suggests that the specimen may have come from America.

DESMODIUM KINGIANUM Prain in Journ. As. Soc. Beng. **66**[2] (1897) 398.

The type of this species was from Burma. Usteri [47] has reported it from Cebu and Panay, but I have seen no Philippine specimens that agree with Prain's description. The Philippine reference may have been based on erroneously identified material.

DESMODIUM RENIFORME DC.; F.-Vill. Nov. App. (1880) 62.

A species not definitely known from the Philippines. It is reported from India and Java.

Desmodium Desv. (1813) is antedated by *Meibomia* Adans. (1763), and *Pleurolobus* St. Hil. (1812), but is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

48. MONARTHROCARPUS gen. nov.

Calycis tubus brevis; lobi 2 superiores alte connati, 3 inferiores subcaudato-acuminati. Corolla ut in *Desmodio;* vexillum orbiculari-obovatum basi angustatum; alae oblongae, carinae adhaerentes. Stamen vexil-

[47] Beitr. Ken. Phil. Veg. (1905) 115.

lare a basi liberum, caetera connata. Ovarium stipitatum, 1-ovulatum. Legumen stipitatum, compressum, non articulatum, indehiscens, lanceolato-acinaciforme, acuminatum, reticulatum, monospermum. Semen estrophiolatum, anguste oblongum. Frutex parvus, suberectus. Folia 3- vel 1-foliolata, foliolis amplis, basi triplinerviis. Flores parvi, racemosi vel rarius paniculati.

Monarthrocarpus securiformis (Benth.) comb. nov.

Desmodium securiforme Benth. Pl. Jungh. (1852) 226; Miq. Fl. Ind. Bat. 1[1] (1855) 255; F.-Vill. Nov. App. (1880) 62; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 108.

An undershrub 20 to 60 cm high, erect or slightly scandent, the stem grayish or brownish, 3 to 4 mm in diameter, glabrous, smooth, simple, or very rarely with one or two branches, the younger parts densely puberulent. Leaves trifoliolate, the common petiole and rachis 5 to 10 cm long; stipules lanceolate, acuminate, 5 to 7 mm long, striate, puberulent; stipels acicular, puberulent, 3 to 5 mm long; leaflets subrhomboid, oblong-ovate to elliptic-ovate, chartaceous or submembranaceous, glabrous on the upper surface, the lower somewhat puberulent on the veins and reticulations, the apex rather strongly subcaudate acuminate, the base triangular-acute, the terminal leaflet equilateral 9 to 20 cm long, 5 to 7.5 cm wide, the lateral ones one-half to two-thirds as large, and somewhat inequilateral at the base, the rachis prolonged 1 to 3 cm beyond the insertion of the lateral leaflets; nerves prominent on the lower surface, a pair of opposite or alternate ones leaving the midrib at 5 to 10 mm above the base and extending to or above the middle of the leaflet, the lateral nerves above the subbasal pair 4 or 5 on each side of the midrib, curved-ascending, ultimately anastomosing, the reticulations distinct, rather lax; petiolules puberulent, 2 to 4 mm long. Inflorescence terminal, of simple racemes, or rarely forming a 2- or 3-branched panicle, 10 to 20 cm long, puberulent. Flowers white, about 7 mm long, in pairs, the bracteoles ovate-lanceolate, strongly acuminate, 1.5 mm long, the pedicels about 2 mm long. Calyx 3 mm long, puberulent, 2-cleft, the upper lobe with two minute teeth, the lower divided into three ovate-lanceolate, strongly caudate-acuminate, 1.5 mm long teeth. Standard orbicular-obovate, about 6 mm long, 5 mm wide, rounded, base narrowed to the short claw; wings about 2 mm wide, united to the keel. Vexillary filament free throughout. Ovary stipitate, lanceolate, narrowed at both ends, viscid-puberulent, with a single ovule. Pod not articulated, compressed, lanceolate-acinaciform, narrowed at both ends, stipitate, the apex prominently acuminate, somewhat falcate or nearly straight, the upper suture usually straight, the lower curved, scabrous-puberulent, indehiscent, strongly reticulate, the pericarp coriaceous, 2 to 3 cm long, 4 to 5 mm wide. Seed solitary, brown, glabrous, narrowly oblong,

blunt at both ends, straight or slightly curved, about 2 cm long, and 3 mm wide, often thicker in one half than in the other.

LUZON, Province of Laguna, *Cuming 576* (type in Herb. Kew.), *Elmer 8250*, *Alberto s. n.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 293*, *s. n.* BASILAN, *For. Bur. 3456 Hutchinson.* POLILLO, *Bur. Sci. 10761 McGregor.*

A sylvan species extending from slightly above sea level to an altitude of at least 800 m.

Var. **monophylla** var. nov.

Differt a typo foliis omnibus unifoliolatis.

MINDANAO, District of Davao, Catalonan, *Copeland 937*, April, 1904, in forests, altitude 125 m.

This endemic species was originally described by Bentham as *Desmodium securiforme*, and placed by him in the section *Podocarpium*, stating that the articulations of the pods are usually solitary; a rather complete series of specimens shows that the pods are always reduced to a single joint, and that in a number of flowers examined, from different specimens, the ovaries never show traces of more than one joint, or more than one ovule. It has the general appearance of various species of *Desmodium* of the section *Podocarpium*, and has undoubtedly been derived from the section; it is, however, distinguishable from all species of *Desmodium* by its 1-seeded, nonarticulated pods, 1-ovuled ovaries, and narrowly oblong seeds, and I consider it to be generically distinct.

While *Monarthrocarpus* may not be distinguished from *Desmodium* by stronger characters than some of the sections of that genus, such as *Dendrolobium*, *Phyllodium*, etc., it has been considered expedient to propose for it generic rank, although logically, it should, perhaps be treated only as a section. As noted in the introduction to this paper, for purposes of comparison, genera have been retained as defined by Bentham and Hooker in their Genera Plantarum, or by Taubert in the Natürlichen Pflanzenfamilien, and hence I have not followed some recent botanists in raising various sections or subgenera of *Desmodium*, *Cassia*, etc., to generic rank, although in a number of cases I have no doubt but that some of the sections or subgenera are worthy of being so treated.

49. PSEUDARTHRIA W. & A.

1. **Pseudarthria viscida** (Linn.) W. & A. Prodr. (1834) 209; Wight Ic. *t. 286;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 154; Ceron Cat. Pl. Herb. (Manila) (1892) 62.

Hedysarum viscidum L. Sp. Pl. (1753) 747.

Desmodium viscidum DC. Prodr. 2 (1825) 336.

Desmodium timoriense DC. l. c. 327.

PANAY, *Yoder 40, Copeland s. n.*

India and Ceylon to Timor; not reported from the Malay Peninsula.

Dr. H. Lecomte of the Museum of Natural History, Paris, has kindly compared material of *Yoder 40* with the type collection of *Desmodium timoriense* DC., and informs me that the Philippine material is the same as DeCandolle's species, which is here accordingly reduced.

50. PYCNOSPORA R. Br.

1. **Pycnospora nervosa** (Grah.) W. & A. Prodr. (1834) 197.

Crotalaria ? nervosa Grah. in Wall. Cat. (1832) no. 5428, nomen.

Pycnospora hedysaroides R. Br. ex W. & A. l. c.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 153; F.-Vill. Nov. App. (1880) 60; Vid. Rev. Pl. Vasc. Filip. (1886) 108.

LUZON, Province of Benguet, *Williams 921, 1401.* SEMERARA, *Merrill 4145.* CULION, *Merrill 681.* MINDANAO, Lake Lanao, *Mrs. Clemens s. n.:* District of Davao, *Williams 2629, 2951.*

India and Ceylon to southern China and Formosa, and northern Australia, but not as yet reported from the Malay Peninsula or Archipelago.

The earliest specific name for this species is possibly supplied by *Flemingia polysperma* Moon Cat. (1824) 54, but the identity of Moon's species appears to be doubtful, as it is questionably referred here both by Wight & Arnott, and by Trimen. The original use of *Crotalaria ? nervosa* Grah. is a *nomen nudum,* and has no standing, but *Pycnospora nervosa* was published by Wight & Arnott, and it is considered that this name has precedence over the more commonly used *P. hedysaroides* R. Br., which was mentioned by Wight & Arnott only incidentally.

51. ALYSICARPUS Neck.

Calyx equaling several joints of the pod; pods glabrous, not at all rugose; leaves linear or lanceolate-linear; racemes slender, 8 to 15 cm long.
1. *A. bupleurifolius*

Calyx equaling the first or second joint of the pod only; pods glabrous or puberulent, distinctly rugose; leaves various, but never linear or linear-lanceolate; racemes less than 8 cm long.

Erect or suberect, often 1 m high, the branches sometimes hirsute with long, scattered, spreading hairs, never puberulent; leaves elliptic to elliptic-oblong, usually retuse at both ends; racemes lax, pods entirely glabrous.
2. *A. vaginalis*

Prostrate or spreading, rarely ascending, the branches usually less than 50 cm long; branchlets minutely puberulent; leaves exceedingly variable, acute, acuminate, or at least apiculate at the apex, never retuse; racemes dense; pods puberulent ..... 3. *A. nummularifolius*

1. **Alysicarpus bupleurifolius** (Linn.) DC. Prodr. 2 (1825) 352; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 158; Miq. Fl. Ind. Bat. 1[1] (1855) 232; F.-Vill. Nov. App. (1880) 61; Vidal Rev. Pl. Vasc. Filip. (1886) 108.

Hedysarum bupleurifolium Linn. Sp. Pl. (1753) 745.

Tetragonolobus simplicifolius Blanco Fl. Filip. ed. 2 (1845) 397, ed. 3, 2: 364 ?

Fabricia bupleurifolia O. Kuntze Rev. Gen. Pl. (1891) 181.

LUZON, Province of Pangasinan, *Bur. Sci. 4977 Ramos:* Province of Tarlac, *Merrill s. n.:* Province of Rizal, *Merrill:* Manila, *McGregor 62.* MINDANAO. District of Davao, *Copeland 363, Williams 2988.*

India and Ceylon, the Mascarene Islands, to southern China, Java, Timor, and Polynesia; not reported from the Malay Peninsula.

Tetragonolobus simplicifolius Blanco is referred here with doubt, as the short description does not apply in all respects; it is perhaps the same as *A. tetragonolobus* Edgw., where it was referred by F.-Villar, but I have seen no Philippine material at all approaching the latter species, which is definitely known only from India.

2. **Alysicarpus vaginalis** (Linn.) DC. Prodr. **2** (1825) 353; Miq. Fl. Ind. Bat. **1**[1] (1855) 231; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 158; Trimen Fl. Ceyl. **2** (1894) 44; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 132.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2302 Mearns:* Province of Bataan, *Williams 166:* Province of Pangasinan, *Bur. Sci. 4866 Ramos:* Province of Rizal, *Cuzner 11.*

India and Ceylon to the Malay Archipelago; other distribution doubtful on account of more or less confusion, by various authors, with the next.

3. **Alysicarpus nummularifolius** (Linn.) DC. Prodr. **2** (1825) 353.

Hedysarum nummularifolium Linn. Sp. Pl. (1753) 746, in part, excl. Fl. Zeyl, 288, which is *Indigofera echinata* Willd., fide Trimen.

Alyscicarpus vaginalis var. *nummularifolius* Miq. Fl. Ind. Bat. **1**[1] (1855) 232; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 158; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 133.

Fabricia nummulariaefblia O. Kuntze Rev. Gen. Pl. (1891) 181.

BATANES ISLANDS, Sabtan, *Bur. Sci. 3735 Fénix, Bur. Sci. 10133 McGregor.* LUZON, Province of Zambales, *Merrill 320, 320a:* Province of Pampanga, *Bolster 48:* Province of Bulacan, *Yoder 250:* Manila, *McGregor 71, Merrill 65, 3462, Santiago 50:* Province of Bataan, *Elmer 6778, Merrill 3091, Whitford 407, Williams 59:* Province of Rizal, *Cuzner 12.* MINDORO, *McGregor 321.* PALAWAN, *Bur. Sci. 893 Foxworthy.* BALABAC, *Bur. Sci. 412 Mangubat.* CEBU, *Barrow 14.* NEGROS, *For. Bur. 13717 Curran.* PANAY, *Copeland s. n., Yoder 10.* BOHOL, *Bur. Sci. 1243 McGregor.* MINDANAO, Lake Lanao, *Mrs. Clemens 8, s. n.:* District of Cotabato, *Copeland s. n.:* District of Zamboanga, *Williams 2101.* BASILAN, *DeVore & Hoover 37.*

Native names: *Manimanihan, Manimani* (Manila); *banig-usa* (Bataan).

Widely distributed in the Philippines at low altitudes; India and Ceylon to southern China and Formosa, the Malay Peninsula and Archipelago to Polynesia; introduced in tropical America.

This was reduced by Miquel as a variety of *Alysicarpus vaginalis*, in which he has been followed by later authors. Prain states that the distinguishing characters are the spreading habit and condensed racemes of *nummularifolius*, and the ascending stems and lax racemes of *vaginalis*, and that the leaf characters depended upon by many botanists are not sufficiently constant; so far as our material goes, other apparently good characters are the much larger size, retuse leaves, and glabrous pods of *vaginalis*, and the smaller size, acute, acuminate or apiculate leaves, and puberulent pods of *nummularifolius*.

Specimens identified by Perkins [48] as *A. vaginalis* are rather *A. nummularifolius*, as well as those so determined by myself.[49] The leaves are exceedingly variable, elliptic, ovate, oblong, and even lanceolate ones being sometimes found on the same specimen; while on some plants, only elliptic, or ovate, or oblong leaves are found.

The original *Hedysarum nummularifolium* Linn. is a mixture, but I consider that it is typified by the reference to Petiver Gaz. 41, *t. 26, f. 4, "Onobrychis maderaspat. nummulariae folio, ..."* from which the specific name was taken. Mr. Oakes Ames has kindly supplied me with a tracing of this figure, and it unquestionably represents the species as here interpreted. Linnaeus' first reference is to "Fl. zeyl. 288," and the specimen in Hermann's Herbarium is *Indigofera echinata* Willd.[50]

[48] Frag. Fl. Philip. (1904) 19.
[49] *This Journal* **1** (1906) Suppl. 65; l. c. **3** (1908) Bot. 410.
[50] Trimen Fl. Ceyl. **2** (1894) 21.

52. URARIA Desv.

Stems erect, heads long-cylindric, 10 to 20 cm long; upper leaves 5–9-foliolate, the leaflets linear-lanceolate ..... 1. *U. picta*
Stems trailing, heads short, oblong, less than 8 cm long; leaves simple and trifoliolate, the leaflets oblong-rhomboid to elliptic ..... 2. *U. lagopodioides*

1. **Uraria picta** (Jacq.) Desv. Journ. Bot. 1 (1813) 123, *t. 5, fig. 19;* DC. Prodr. 2 (1825) 324; Miq. Fl. Ind. Bat. 1[1] (1855) 267; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 430; F.-Vill. Nov. App. (1880) 61; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 155; Vidal Rev. Pl. Vasc. Filip. (1886) 108.

Hedysarum pictum Jacq. Coll. 2 (1788) 262; Ic. 3 (1786–93) *t. 567.*

Luzon, Province of Cagayan, *Bur. Sci. 7924 Ramos:* Province of Isabela, *Bur. Sci. 8110 Ramos:* Province of Nueva Vizcaya, *Merrill 393:* Province of Benguet, *Williams 1416:* Province of Bataan, *Merrill 6247.* Mindoro, *Bur. Sci. 1521 Bermejos.* Mindanao, District of Davao, *Williams 2929.*

Tropical Africa and Asia to China and Formosa, Malaya to northern Australia; introduced in the West Indies.

2. **Uraria lagopodioides** (Linn.) Don Prodr. Fl. Nepal. (1825) 324; Desv. Mém. Soc. Linn. Paris 4 (1826) 309; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 358.

Hedysarum lagopodioides Linn. Sp. Pl. (1753) 1198.

Hedysarum lagopoides Burm. f. Fl. Ind. (1768) 168, *t. 53, fig. 2.*

Uraria lagopoides DC. Prodr. 2 (1825) 324; Miq. Fl. Ind. Bat. 1[1] (1855) 268; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 430; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 156; Prain in Journ. As. Soc. Beng. 66[2] (1897) 131, 380.

Luzon, Province of Cagayan, *Bolster 160:* Province of Ilocos Norte, *For. Bur. 13949 Merritt & Darling:* Province of Benguet, *Williams 1404:* Province of Nueva Ecija, *Merrill 392:* Province of Rizal, *Cuzner 15, Guerrero 21:* Province of Laguna, *Hallier s. n.:* Manila, *McGregor 67.* Mindoro, *Merrill 888.* Negros, *For. Bur. 13716 Curran, For. Bur. 11227 Everett.* Panay, *Yoder 19.* Bohol, *Bur. Sci. 1242 McGregor.* Mindanao, Lake Lanao, *Mrs. Clemens 310, s. n.:* District of Davao, *Williams 2712, DeVore & Hoover 105, Copeland 369.*

Widely distributed in the Philippines in open grass lands, especially at low and medium altitudes; India and Ceylon to southern China, Formosa, Malaya to northern Australia.

The earliest specific name, *lagopodioides,* is here retained, especially as Prain states, l. c. 380, that there is now no longer any doubt as to the identity of *Hedysarum lagopodioides* Linn., with *Uraria lagopoides* (Burm.) DC. Curiously, Blanco seems to have overlooked this common species entirely.

53. LOUREA Neck.

Stems erect; leaflets 1, rarely 3, 4 to 6 times as broad as long.. 1. *L. vespertilionis*
Stems prostrate; leaflets 3, rarely 1, about as broad as long..... 2. *L. reniformis*

1. **Lourea vespertilionis** (Linn. f.) Desv. Journ. Bot. 1 (1813) 122, *t. 5, fig. 18;* DC. Prodr. 2 (1825) 323; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 154; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 178; F.-Vill. Nov. App. (1880) 60.

Hedysarum vespertilionis Linn. f. Suppl. (1781) 331; Blanco Fl. Filip. (1837) 581, ed. 2 (1845) 407, ed. 3, 2: 382; Naves l. c. *pl. 201.*

It is doubtful if this species should be admitted as Philippine, as Blanco states that he saw only cultivated specimens, and F.-Villar makes the same statement. I have seen no Philippine material either wild or cultivated. The species is widely distributed in the tropics of the world.

2. **Lourea reniformis** (Lour.) DC. Prodr. **2** (1825) 324.

Hedysarum reniforme Lour. Fl. Cochinch. (1790) 447, excl. syn. fide DC.

Hedysarum obcordatum Poir. in Lam. Encycl. **6** (1804) 425.

Lourea obcordata DC. Prodr. **2** (1825) 324; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 154; F.-Vill. Nov. App. (1880) 60; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 108; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 178; Perk. Frag. Fl. Philip. (1904) 20.

LUZON, Province of Benguet, *Loher 5119, For. Bur. 16227 Curran, Merritt, & Zschokke:* Province of Cagayan, *Bur. Sci. 7890 Ramos:* Province of Abra, *Bur. Sci. 7245 Ramos.*

Burma to southern China, Formosa, the Malay Archipelago to New Guinea and northern Australia; not reported from the Malay Peninsula.

54. PHYLACIUM Benn.

1. **Phylacium bracteosum** Benn. Pl. Jav. Rar. (1840) 159, *t. 33;* Benth. Pl. Jungh. (1852) 231; Miq. Fl. Ind. Bat. **1**[1] (1855) 228; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 423; Vidal Rev. Pl. Vasc. Filip. (1886) 108; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 129, 387; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 65.

LUZON, Province of Ilocos Sur, *For. Bur. 14047 Merritt & Darling:* Province of Benguet, *For. Bur. 16222 Curran, Merritt, & Zschokke, Bur. Sci. 3513 Mearns, Elmer 6051:* Province of Tarlac, *Merrill 3631:* Province of Bulacan, *Yoder 158:* Province of Rizal, *Merrill 1331:* Province of Bataan, *Merrill 1563, 3777, Bur. Sci. 1893 Foxworthy, For. Bur. 2734 Borden, Elmer 6701, Copeland 295:* Province of Tayabas, *For. Bur. 9655 Curran.* MINDORO, *For. Bur. 11373, 11422 Merritt, McGregor 136.* NEGROS, *For. Bur. 11225 Everett.* MINDANAO, District of Davao, *Williams 2080, Copeland 644.*

Widely distributed in the Philippines, in the thickets at low and medium altitudes; Malay Peninsula, Sumatra, Java, Amboina, the Bismarck Archipelago and New Guinea.

Native names: *Malasincamas* (Bataan); *papuraena* (Rizal); *taquilis* (Negros).

55. LESPEDEZA Michx.

1. **Lespedeza juncea** Pers. var. **sericea** (Thunb.) Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 181; Merr. & Rolfe in Philip. Journ. Sci. **3** (1908) 104.

Hedysarum sericeum Thunb. Fl. Jap. (1784) 287.

Lespedeza sericea Miq. Ann. Mus. Ludg.-Bat. **3** (1867) 49.

LUZON, Province of *Benguet, Loher 2336, Williams 1420:* District of Bontoc, *Bur. Sci. 5991 Ramos.*

In the Philippines apparently confined to the high tableland of north central Luzon; northern India to China, Formosa, and Japan, also in Australia.

[*To be continued.*]

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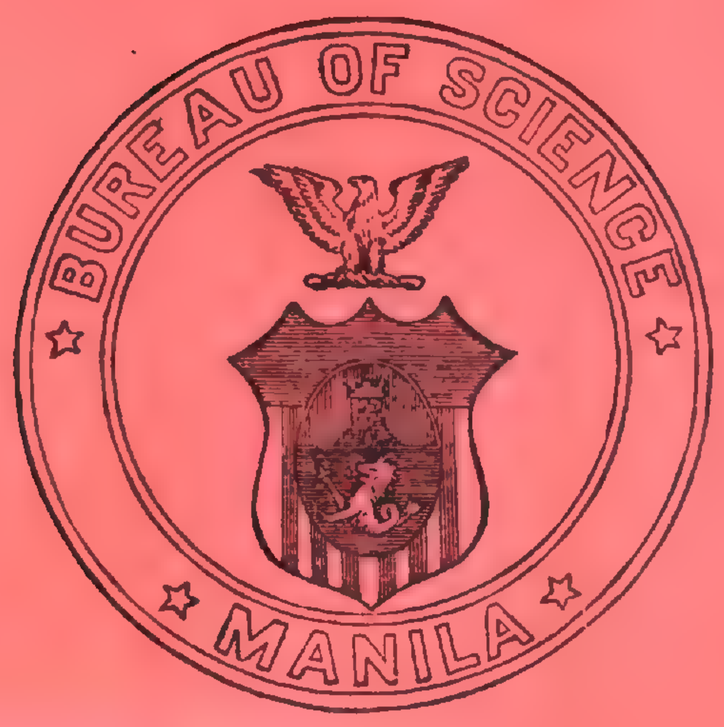

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THE PHILIPPINE

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AN ENUMERATION OF PHILIPPINE LEGUMINOSAE WITH KEYS TO THE GENERA AND SPECIES.

(Concluded.)

By E. D. MERRILL.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

56. **DALBERGIA** Linn. f.

Pod thin and flattened except opposite the seeds, straight or nearly so.

Thin parts of the pod distinctly reticulate, submembranaceous or slightly coriaceous; leaflets small, mostly less than 7 mm wide.

Leaflets distinctly oblique at the base, trapezoid-oblong, 5 to 7 mm wide. 1. *D. pinnata*

Leaflets equal or subequal at the base, linear-oblong, less than 4 mm wide. 2. *D. polyphylla*

Thin parts of the pod not or very obscurely reticulate, firmly coriaceous; leaflets medium, mostly 1 to 2 cm. wide.

Scandent; the portion of the pod opposite the seeds sharply defined, swollen; seeds orbicular ..... 3. *D. ferruginea*

An erect tree; the portion of the pod opposite the seeds usually not sharply defined, not or but slightly swollen; seeds oblong or ovate-oblong. 4. *D. minahassae*

Pod uniformly thickened throughout the valves, the upper suture curved or falcate, at least when young.

Scandent; pod flattened, the upper suture concave when ripe; leaflets obovate or obovate-oblong; flowers in short, congested panicles. 5. *D. candenatensis*

An erect tree; pod turgid, the upper suture straight or nearly so when ripe; leaflets elliptic to elliptic-ovate, narrowed towards the apex; inflorescence of rather lax, cymose panicles..... 6. *D. cumingii*

1. **Dalbergia pinnata** (Lour.) Prain in Ann. Bot. Gard. Calcutta **10**[1] (1904) 48.

Derris pinnata Lour. Fl. Cochinch. (1790) 432.

Dalbergia tamarindifolia Roxb. Hort. Beng. (1814) 53, nomen, Fl. Ind. **3** (1832) 233, pro parte; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 234; F.-Vill. Nov. App. (1880) 67; Vidal Rev. Pl. Vasc. Filip. (1886) 111; Perk. Frag. Fl. Philip. (1904) 82; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 117, **70**[2] (1901) 49, Ann. Bot. Gard. Calcutta **10**[1] (1904) 69, *pl. 48*.

Endespermum scandens Blume Cat. Gew. Buitenzorg (1823) 92, Flora **8** (1825) 132, non *Dalbergia scandens* Roxb.

Luzon, Province of Zambales, *Bur. Sci. 2529 Foxworthy:* Province of Rizal, *Merrill 1772, For. Bur. 453, 1169 Ahern's collector, Bur. Sci. 1387 Ramos, Decades Philip. Forest Fl. no. 159 Ahern's collector.* Mindoro, *McGregor 244, For. Bur. 12004 Merritt.* Palawan, *Merrill 699.* Mindanao, Lake Lanao, *Mrs. Clemens 615.*

Widely distributed in the Philippines, extending from sea level to an altitude of at least 800 m; Himalayan region to Burma, southern China, Indo-China, the Malay Peninsula, Sumatra, Java, and Borneo.

Var. **badia** var. nov.

A typo differt foliolis in sicco brunneis, nitidis, supra glabris, coriaceis.

Luzon, Province of Tayabas, Pitogo, *For. Bur. 9649 Curran*, in thickets along the seashore.

At first sight this form appears to be quite distinct from the species, but the differences are apparently mainly in the color of the dried leaves, which are dark-brown, glabrous above, and strongly shining; the fruits are apparently identical with those of the typical form.

Derris pinnata Lour. has been reduced by various authors to *Dalbergia tamarindifolia* Roxb., but the reduction was not accepted by Dr. Prain in his monograph of the Asiatic species of *Dalbergia*, because Loureiro described the leaflets as glabrous. At my request Mr. E. G. Baker has kindly looked up Loureiro's type specimen, preserved in the herbarium of the British Museum, and has supplied me with sketches of the flower and a single leaflet. Mr. Baker writes as follows: "The leaflets *are not glabrous* as stated by Loureiro, but are strigose-pubescent beneath; the lobes of the calyx are short and might almost be described as subequal; the bracteoles are roundish and 2 mm long; the alæ are very similar to those figured by Colonel Prain, in his monograph, of *D. tamarindifolia* Roxb., and the keel is also subsimilar. It appears to me that without question it is very closely allied indeed, if not identical with *D. tamarindifolia* Roxb."

After studying the material available here, with reference to Loureiro's description and the data supplied by Mr. Baker, I am convinced that *Derris pinnata* Lour. is specifically identical with *Dalbergia tamarindifolia* Roxb., and the oldest specific name is hence adopted.

2. **Dalbergia polyphylla** Benth. Pl. Jungh. (1852) 256, pro parte, Journ. Linn. Soc. Bot. **4** (1860) Suppl. 44, pro parte; Miquel Fl. Ind. Bat. **1**[1] (1855) 132; F.-Vill. Nov. App. (1880) 67; Vidal Rev. Pl. Vasc. Filip. (1886) 112; Prain in Journ. As. Soc. Beng. **70**[2] (1901) 48, Ann. Bot. Gard. Calcutta **10**[1] (1904) 70, *pl. 49*.

Luzon, Province of Ilocos Sur, *Cuming 1164* in Herb. Kew.: Province of Rizal, *For. Bur. 2962 Ahern's collector:* Province of Bataan, *Whitford s. n.*

Endemic.

3. **Dalbergia ferruginea** Roxb. Hort. Beng. (1814) 98, nomen, Fl. Ind. **3** (1832) 228; Benth. Pl. Jungh. (1852) 256; Miq. Fl. Ind. Bat. **1**[1] (1855) 133; Prain in Journ. As. Soc. Beng. **70**[2] (1901) 55, Ann. Bot. Gard. Calcutta **10**[1] (1904) 101, *pl. 86;* Perk. Frag. Fl. Philip. (1904) 81; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Dalbergia luzonensis Vog. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**:33; Miq. Fl. Ind. Bat. **1**[1] (1855) 133.

Dalbergia limonensis Benth. Pl. Jungh. (1852) 256, sphalm.

Dalbergia stipulacea F.-Vill. Nov. App. (1880) 67; Vid. Sinopsis Atlas (1883) *t. 40, fig. C,* Rev. Pl. Vasc. Filip. (1886) 111, non Roxb.

Batanes Islands, Sabtan, *Bur. Sci. 10137 McGregor, Bur. Sci. 3739 Fénix.* Luzon, Province of Isabela, *Bur. Sci. 8038 Ramos:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *Merrill 1380:* Province of Bulacan, *For. Bur. 7202 Curran:* Province of Laguna, *Elmer, Alberto:* Province of Bataan, *Whitford 90, Leiberg 6028, Williams 480, Merrill 2493:* Province of Rizal, *Merrill 2694, 1693, Guerrero 25, For. Bur. 2887 Ahern's collector:* Province of Tayabas, *Merrill 2421, 2436, Bur. Sci. 2995 Mearns.* Mindoro, *Merrill 2205.* Mindanao, Province of Surigao, *Ahern 632:* District of Davao, *Williams 2855.*

Native names: *Culic manoc* (Pampanga); *guipus-guipus* (Surigao); *mala-malungoyon* (Bataan); *balibagan* (Panay), ex Vidal.

Widely distributed in the Philippines at low altitudes; Borneo to Buru, Celebes, New Guinea and the Caroline Islands.

4. **Dalbergia minahassae** Koord. Meded. s' Lands Plantent. **19** (1898) 430, 630; Prain in Ann. Bot. Gard. Calcutta **10**[1] (1904) 91, *pl. 73.*

Luzon, Province of Bulacan, *For. Bur. 11189 Aguilar:* Province of Rizal, *For. Bur. 408 Ahern's collector, Bur. Sci. 959, 4633 Ramos:* Province of Bataan, *Bur. Sci. 1899 Foxworthy, For. Bur. 12951 Alvarez, For. Bur. 5773 Curran:* Province of Tayabas, *Whitford 985.* Mindoro, *For. Bur. 8822, 8846, 9746, 11445 Merritt.*

Native names: *Balabagan, balaugan* (Mindoro); *malacagios* (Rizal).

Celebes.

I am not at all sure that all the specimens cited above are really referable to this species, or whether two or three very closely allied forms are represented. Most of the specimens are described by the collectors as trees, but one or two are indicated as scandent. I consider this to be the most probable identification of *Amerimnon mimosella* Blanco, the type of which came from Tala, a locality near the boundary between the Provinces of Bulacan and Rizal.

5. **Dalbergia candenatensis** (Dennst.) Prain in Journ. As. Soc. Beng. **70**[2] (1901) 49, Bengal Plants (1903) 411.

Cassia candenatensis Dennst. Schl. zum Hort. Malabar. (1818) 32.

Dalbergia monosperma Dalz. in Hook. Journ. Bot. and Kew Miscel. **2** (1850) 36; Benth. Pl. Jungh. (1852) 256; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 337; F.-Vill. Nov. App. (1880) 67; Vidal Rev. Pl. Vasc. Filip. (1886) 112; Perk. Frag. Fl. Philip. (1904) 82.

Dalbergia torta Grah. in Wall. Cat. (1832) no. 5873; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 120, Ann. Bot. Gard. Calcutta **10**[2] (1904) 64, *pl. 42;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66.

Luzon, Province of Bataan, *Whitford s. n.:* Province of Tayabas, *Whitford 582.* Mindoro, *Merrill 1260.* Negros, *For. Bur. 7323 Everett.* Cebu, *Bur. Sci. 1716 McGregor.*

India to southern China, the Malay Peninsula and Archipelago to northern Australia, the Caroline Islands, and Polynesia.

6. **Dalbergia cumingiana** Benth. Pl. Jungh. (1852) 255; Miq. Fl. Ind. Bat. **1**[1] (1855) 129; F.-Vill. Nov. App. (1880) 67; Vid. Phan. Cuming. Philip. (1885) 42, Rev. Pl. Vasc. Filip. (1886) 111; Prain in Journ. As. Soc. Beng. **70**[1] (1901) 63, Ann. Bot. Gard. Calcutta **10**[2] (1904) 34, *pl. 7;* Perk. Frag. Fl. Philip. (1904) 81.

Dalbergia cumingii Benth. in Journ. Linn. Soc. Bot. **4** (1860) Suppl. 32.

Luzon, Province of Cagayan, *Bur. Sci. 7790 Ramos, For. Bur. 18603 Klemme:* Province of Ilocos Norte, *Cuming 1244* (cotype): Province of Tayabas, *Whitford 701, Gregory 94, For. Bur. 6687 Kobbe:* Province of Camarines, *For. Bur. 10771, 12254, 12255 Curran.* Negros, *For. Bur. 5617 Everett.* Leyte, *Elmer 7154.* Mindanao, Province of Surigao, *Long s. n.:* Lake Lanao, *Mrs. Clemens s. n.* A form from Balabac Island, *Bur. Sci. 406 Mangubat,* with lax panicles and more distinctly veined leaves may also be referable here.

Native names: *Carvilan* (Camarines); *tahid-labuyo* (Tayabas); *cannac* (Cagayan).

Endemic.

DOUBTFUL AND EXCLUDED SPECIES.

Dalbergia mimosella (Blanco) Prain in Ann. Bot. Gard. Calcutta **10**[1] (1904) 42.

Amerimnon mimosella Blanco Fl. Filip. (1837) 563, ed. 2 (1845) 393, ed. 3, **2**:357.

Dalbergia lanceolaria F.-Vill. Nov. App. (1880) 67, non Linn.

This species is known only from Blanco's imperfect description, and I have suggested above that it is the same as *Dalbergia minahassae* Koord., although Blanco's description is not entirely in accord with the characters of that species. The material on which it was based came from Tala, near the boundary between the Provinces of Rizal and Bulacan, Luzon, and according to Blanco is there known as *macapil.* Careful collecting in that locality, with especial reference to the native name, may serve to determine the identity of the species, but until such material is secured I do not think that the species should seriously be considered.

Dalbergia cassioides Wall.; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 457; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 82.

The Philippine record is based on a sterile specimen collected at Caldera, Mindanao, and is manifestly an erroneous identification. I have examined the specimen, which is preserved in the U. S. National Herbarium, and think it is probably a form of *D. ferruginea* Roxb. *D. cassioides* Wall. is a synonym of *D. stipulacea* Roxb., a species that is not known from the Philippines.

Dalbergia zollingeriana Miq. (=*D. parviflora* Roxb.); F.-Vill. Nov. App. (1880) 67. Not represented by any extant botanical material from the Philippines.

Dalbergia discolor Blume; F.-Vill. l. c. A species at present known only from Borneo and Celebes; not represented by any extant Philippine material.

Dalbergia spinosa Roxb.; F.-Vill. l. c. A species of India and Indo-China; not definitely known from the Philippines.

Dalbergia volubilis Llanos in Mem. Acad. Cienc. Madr. **3** (1858) 502; F.-Vill. l. c. 67, non Roxb. Unidentifiable.

Dalbergia lanceolaria Llanos l. c.; F.-Vill. l. c., non Linn. Unidentifiable; probably a species of *Derris.*

According to strict rules of priority the name *Dalbergia* is untenable for this genus as several proposed ones are older. O. Kuntze has adopted the generic appellation *Amerimnon* P. Br. (1756), and transferred to it all the species of *Dalbergia* known to him. *Dalbergia* Linn. f. (1781) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

57. **PTEROCARPUS** Linn.

Seed-bearing portion of the pod thickly beset with elongated slender spines.
1. *P. echinatus*

Pod without spines, glabrous or pubescent.
Pods usually less than 5 cm in diameter..... 2. *P. indicus*
Pods 6 to 8 cm in diameter..... 3. *P. blancoi*

1. **Pterocarpus echinatus** Pers. Syn. **2** (1807) 277; Prain Stray Leaves from Indian Forests 10, with Ind. Forest. **26** (1900); Merr. in Govt. Lab. Publ. (Philip.) **17** (1904) 20.

Echinodiscus echinatus Miq. Fl. Ind. Bat. **1**[1] (1855) 137.

Pterocarpus erinaceus F.-Vill. Nov. App. (1880) 68; Vidal Sinopsis Atlas (1883) *t. 40, fig. B*, non Poir.

Pterocarpus vidalianus Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 309; Vidal Rev. Pl. Vasc. Filip. (1886) 112; Perk. Frag. Fl. Philip. (1904) 20.

Pterocarpus klemmei Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 198.

LUZON, Province of Cagayan, *For. Bur. 4275, 5249, 7086 Klemme, For. Bur. 17127 Curran:* Province of Ilocos Norte, *For. Bur. 13859 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 5662 Klemme:* Province of Bulacan, *For. Bur. 7207 Curran:* Province of Laguna, *For. Bur. 8053 Curran & Merritt:* Province of Tayabas, *Merrill 1016, 2597, 2050, For. Bur. 10747 Curran, Hagger s. n.:* Province of Camarines, *For. Bur. 14334 Aguilar, For. Bur. 10633, 10729 Curran.* MINDORO, *For. Bur. 9895 Merritt.*

Celebes, Selayer.

In spite of the apparent difference between the fruits of this and the next species, the two are so closely allied that I have been unable to find any constant characters by which sterile or flowering specimens can be distinguished, and accordingly a number of flowering specimens which doubtless belong in part to the present species, are cited below, although probably they for the greater part belong to the next, which is the more common and widely distributed one in the Philippines. The specimens cited above are all with fruit.

Two specimens in the herbarium of the Bureau of Science show some steps of intergradation between *P. echinatus* and *P. indicus;* the first (*For. Bur. 10425 Curran,* Camarines Province, Luzon), presents the pods with numerous, very short spines, less than 1 mm long, on most of the pods, but with other pods with no traces of these short spines; the second (*For. Bur. 7060 Klemme,* Cagayan Province, Luzon) presents pods for most part entirely smooth, but 3 or 4 of the 15 on the specimen have each from two to five spines in all respects similar to those of *P. echinatus.*

Pterocarpus klemmei is here reduced to *P. echinatus,* as I am convinced that the type of the former is only a specimen of the latter species with very immature pods.

Flowering specimens, in part doubtless referable to the above species, but probably for the greater part belonging to the following one:

LUZON, Province of Cagayan, *For. Bur. 16956, 17190 Curran, For. Bur. 11289 Klemme, For. Bur. 18488, 18521 Alvarez:* Province of Tayabas, *For. Bur. 370 Bath, Merrill 2592, 1984, 2044, For. Bur. 6067 Kobbe, For. Bur. 6629 Reyes, For. Bur. 10293 Curran.* MINDORO, *Merrill 2231, Whitford 1473, For. Bur. 3675, 6729 Merritt.* PALAWAN, *For. Bur. 3840 Curran, For. Bur. 7441 Manalo.* BALABAC, *Bur. Sci. 391 Mangubat.* SAMAR, *For. Bur. 15063 Rosenbluth.* LEYTE, *For. Bur. 12632 Rosenbluth.* MINDANAO, Province of Surigao, *Bolster 234:* Lake Lanao, *Mrs. Clemens 288.*

In addition to the above material, there are about 40 additional sheets, consisting of leaf specimens only, in the herbarium of the Bureau, which are not cited here. This material comes from many different localities from northern Luzon to southern Mindanao, and is apparently all referable to either *P. echinatus* or to *P. indicus*.

2. **Pterocarpus indicus** Willd. Sp. Pl. **3** (1800) 904; Miq. Fl. Ind. Bat. **1**[1] (1855) 135; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 238, in part; F.-Vill. Nov. App. (1880) 67; Vidal Sinopsis Atlas (1883) *t. 40, fig. A;* Prain in Journ. As. Soc. Beng. **66**[2] (1897) 123, Stray Leaves from Indian Forests 7, with Ind. Forest. **26** (1900).

Pterocarpus pallidus Blanco Fl. Filip. (1837) 560, ed. 2 (1845) 391, ed. 3, **2**:355; Naves l. c. *pl. 205.*

Babuyanes Islands, Camiguin, *Bur. Sci. 3976 Fénix:* Luzon, Province of Pangasinan, *For. Bur. 8315 Curran & Merritt:* Manila, *For. Bur. 19017 Curran* (cult.): Province of Camarines, *For. Bur. 10681 Curran:* Province of Sorsogon, *For. Bur. 10517 Curran.* Mindoro, *For. Bur. 9741, 4102, 8655, 5376 Merritt, Merrill 2580, Bur. Sci. 1543 Bermejos.* Masbate, *Merrill 2620, For. Bur. 1002 Clark, Whitford 1688.* Ticao, *For. Bur. 1019 Clark.* Leyte, *Elmer 7126.* Negros, *For. Bur. 12421 Danao.* Mindanao, District of Zamboanga, *For. Bur. 9346 Whitford & Hutchinson:* Province of Surigao, *Bolster 328:* Province of Misamis, *Alga 1.*

Tenasserim to southern China, the Malay Peninsula, Sumatra, Java, Celebes, New Guinea and the Caroline Islands.

As was the case with *Pterocarpus echinatus* Pers., only specimens with fruits have been here cited; most of the flowering specimens cited above probably belong with *P. indicus.*

This species and the above yield the valuable timber known in the Philippines as *narra,* which is very similar to the *padouk* of India. The most usual native names are *asana, naga,* and *narra,* and are applied indiscriminately to all three species here recognized; other native names are: *odias* (Pangasinan); *nala* (Abra); *taga* (Cagayan); *balauning* (Mindoro); *daitanag,* ex Blanco.

3. **Pterocarpus blancoi** Merr. in Govt. Lab. Publ. (Philip.) **6** (1904) 7.

Pterocarpus santalinus Blanco Fl. Filip. (1837) 561, ed. 2 (1845) 392, ed. 3, **2**:356; F.-Vill. Nov. App. (1880) 67, non Linn.

Luzon, Province of Union, *Elmer 5690:* Province of Tarlac, *Merrill 2881:* Province of Nueva Ecija, *For. Bur. 11054 Saroca:* Province of Bulacan, *For. Bur. 7203 Curran:* Province of Rizal, *Merrill 2809, Bur. Sci. 987 Ramos, Decades Philip. For. Fl. no. 203 Ramos.*

The same native names are applied to this as to the preceding species; in Pampanga it is known as *apalit.*

Endemic; apparently closely allied to *P. papuanus* F. Muell. of New Guinea.

Pterocarpus blancoi is perhaps not specifically distinct from *P. indicus;* it is characterized by its much larger pods (6 to 8 cm in diameter), while *P. indicus,* at least the typical form, usually has pods 5 cm or less in diameter; some forms cited above under *P. indicus* have at least some pods 6 cm in diameter; as a rule the leaflets of *P. blancoi* are relatively narrower and more acuminate than are those of *P. indicus,* but these characters are not entirely constant.

EXCLUDED SPECIES.

Pterocarpus flavus Lour.: F.-Vill. Nov. App. (1880) 67.

Probably an erroneous identification, on the part of F.-Villar, for some form of *Pterocarpus indicus.* Loureiro's species is not a *Pterocarpus,* but is *Pongamia mitis* (L.) Merr. (*P. glabra* Vent.).

58. **PONGAMIA** Vent.

1. **Pongamia mitis** (Linn.) comb. nov.

Robinia mitis Linn. Sp. Pl. ed. 2 (1763) 1044.

Cytisus pinnatus Linn. l. c. ed. 1 (1753) 741, saltem pro parte (excl. Pluk. phyt. 104. f. 3).

Galedupa indica Lam. Encycl. 2 (1786) 594 (excl. syn. *Caju galedupa* Rumph.).

Dalbergia arborea Willd. Sp. Pl. (1800) 901.

Pongamia glabra Vent. Jard. Malm. 1 (1803) *t. 28*; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 240; Prain in Journ. As. Soc. Beng. 66 [2] (1897) 94, 456; F.-Vill. Nov. App. (1880) 68; Vidal Sinopsis Atlas (1883) *t. 41, fig. C*, Rev. Pl. Vasc. Filip. (1886) 113.

Galedupa maculata Blanco Fl. Filip. (1837) 559, ed. 2 (1845) 390, ed. 3 2: 353; Naves l. c. *pl. 417*.

Galedupa pinnata Taub. in Engl. & Prantl. Nat. Pflanzenfam. 3 [3] (1891) 344.

LUZON, Province of Cagayan, *For. Bur. 18454 Alvarez:* Province of Zambales, *Hallier s. n.:* Province of Bataan, *Merrill 1510, For. Bur. 5299 Curran:* Province of Tayabas, *For. Bur. 10199 Curran, Merrill 1001, 2586, Whitford 745, 916:* Province of Camarines, *For. Bur. 10768 Curran, Ahern 46, 206.* POLILLO, *Bur. Sci. 9089 Robinson, Bur. Sci. 10762 McGregor.* PALAWAN, *Bur. Sci. 613 Foxworthy, For. Bur. 3773 Curran, Bur. Sci. 304 Bermejos.* TICAO, *For. Bur. 1038 Clark.* PANAY, *Copeland s. n.* NEGROS, *For. Bur. 5614 Everett, For. Bur. 12418 Danao.* CEBU, *For. Bur. 6430 Espinosa.* TINAGO, *Ahern 420.* DINAGAT, *Ahern 496.* MINDANAO, District of Zamboanga, *For. Bur. 12356 Hutchinson, For. Bur. 9200, 9151 Whitford & Hutchinson:* District of Davao, *DeVore & Hoover 236, Copeland 1327, Williams 2787:* Province of Surigao, *Bolster 398.* BASILAN, *For. Bur. 3469 Hutchinson.*

There is some doubt as to the earliest specific name for this species. *Robinia mitis* Linn. (1763) was based in part on *Cytisus pinnatus* Linn., of the first edition of the "Species Plantarum," but in his consideration of *Robinia mitis*, Linnæus excluded the first reference, given in the first edition under *Cytisus pinnatus*, Pluk. phyt. 104. *f. 3.* I have been unable to check this reference to Plukenet, and consider it safer to adopt the second name proposed by Linnæus. B. Daydon Jackson, Esq., secretary of the Linnean Society, has kindly examined the specimen in the Linnean herbarium labeled by Linnæus *Robinia mitis*, and informs me that it an undoubted specimen of the plant usually named *Pongamia glabra*, consisting of a flowering branch in a young state, with a single detached pod.

The material cited above includes the typical form, with medium-sized leaflets and flowers, and also apparently the form described by Zollinger & Moritzi as *Pongamia grandifolia*, with larger leaflets and larger flowers. I find, as Prain has already noted, a great number of intergrading forms, and do not think that the latter can be distinguished by any constant character or set of characters. Among the numerous specimens cited above, *Ahern 420* is apparently typical *P. grandifolia* Zoll. & Mor.

Var. **xerocarpa** (Hassk.) comb. nov.

Pongamia xerocarpa Hassk. Retz. ed nov. 208.

Pongamia glabra var. *xerocarpa* Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 95.

LUZON, Province of Union, *Elmer 5695:* Province of Pangasinan, *Bur. Sci. 4966 Ramos:* Province of Pampanga, *Merrill 1368:* Province of Zambales, *Merrill 2921:* Province of Bataan, *Ahern 776, For. Bur. 2044 Borden, For. Bur. 1424 Ahern's collector:* Province of Tayabas, *Merrill 2036, For. Bur. 12803 Rosenbluth.* MINDORO, *For. Bur. 8645 Merritt.*

This variety differs from the typical form, as noted by Prain, in its more numerous (usually 7 to 9, rarely 5) leaflets, which are much smaller than in the type, mostly less than 3 cm wide.

The species extends along the seashores of the Mascarene Islands to India, southern China, Malaya, to northern Australia, and Polynesia; the var. *xerocarpa* extends from Ceylon to Sumatra, and the Malay Peninsula.

Native names: *Balic-balic* (Manila, Tayabas); *bayoc-bayoc* (Dinagat, Tinago); *baloc-baloc* (Tayabas, Negros, Palawan); *balot-balot* (Camarines); *maroc-baroc* (Camarines, Ticao); *balu-balu* (Basilan); *baoc-baoc* (Cebu); *bani* (Tayabas, Bataan, Pangasinan, Pampanga, Zambales); *baney* (Cagayan).

The name *bani* seems to be more generally applied to the var. *xerocarpa*, which is apparently mostly found at a greater or less distance inland and away from the direct influence of salt water; the typical form is usually found close to the beach.

The generic name *Pongamia* Vent. (1803) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress. The earliest name is *Pongam* Adans. (1763), which was altered to *Pungamia* by Lamarck (1797), and to *Pongamia* by Ventenant (1803). O. Kuntze has adopted the generic appellation *Cajum*, adapted from *Caju galedupa* of Rumphius (1741), while Lamarck (1786), proposed the generic name *Galedupa*, also from Rumphius, and which has been adopted by Taubert in the "Natürlichen Pflanzenfamilien." The case is fully discussed by Prain,[50] with especial reference to the objections to the use of the generic name *Galedupa*.

59. DERRIS Lour.

Standard not callose at the base.

Vexillary filament free throughout; flowers single, in ample thyrsoid panicles with nodes neither tumid nor produced into stalks (§ AGANOPE).

Pod winged only along the upper suture, and sinuate between the seeds; corolla nearly 1.5 cm long ..... 1. *D. diadelpha*

Pod winged down both sutures, not sinuate between the seeds; corolla 1 cm long or less ..... 2. *D. thyrsiflora*

Vexillary filament united with the others, at least in the middle of the tube; flowers fascicled on tumid nodes that are sometimes produced into stalks.

Pod winged along the upper suture.

Pod narrowly oblong to lanceolate, less than 1.5 cm wide, narrowed at both ends, many times longer than broad. (Unknown in *D. polyantha*), (§ BRACHYPTERUM).

Leaflets distinctly retuse at the rather blunt apex, scarcely acuminate, up to 13 cm long; racemes very densely flowered, the rachis densely pubescent ..... 3. *D. polyantha*

Leaflets acute or acuminate, or if retuse then less than 7 cm long and distinctly acuminate.

Pods densely ferruginous-pubescent; an erect tree or shrub. 4. *D. cumingii*

Pods glabrous or nearly so; scandent shrubs.

Leaflets 3 to 7 cm long, the somewhat acuminate apex usually retuse. 5. *D. scandens*

Leaflets 10 to 13 cm long, rather distinctly subcaudate-acuminate, the acumen blunt ..... 6. *D. philippinensis*

[50] Journ. As. Soc. Beng. **66** [2] (1907) 96, 456.

Pod suborbicular or shortly and broadly oblong, 2.5 to 3 cm wide, never more than twice as long as wide, subtruncate at both ends (§ EUDERRIS).
Leaflets 10 to 18 cm long, stipellate; pod slightly pubescent. 7. *D. elegans*
Leaflets rarely exceeding 10 or 12 cm in length, usually shorter, exstipellate; pod glabrous. A littoral species..... 8. *D. trifoliata*
Pod distinctly winged along both sutures. (Unknown in *D. mindorensis*); (§ DIPTERODERRIS).
Leaflets glabrous; pod broadly oblong, about 2 cm wide..... 9. *D. micans*
Leaflets somewhat ferruginous-pubescent..... 10. *D. mindorensis*
Standard with two auriculate callosities at the base of the limb (§ PARADERRIS).
All parts of the plant glabrous..... 11. *D. lianoides*
Young branches, leaves, and inflorescence densely ferruginous-pubescent. 12. *D. elliptica*

1. **Derris diadelpha** (Blanco) comb. nov.

Pterocarpus diadelphus Blanco Fl. Filip. (1837) 563, ed. 2 (1845) 393, ed. 3, **2**: 357.

Pongamia sinuata Wall. Cat. (1832) no. 5911, nomen.

Derris sinuata Thwaites Enum. Pl. Zeyl. (1859) 93; Benth. in Journ. Linn. Soc. Bot. **4** (1860) Suppl. 113; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 246; F.-Vill. Nov. App. (1880) 68; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 98; Perk. Frag. Fl. Philip. (1904) 84; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 66.

Derris floribunda Naves in Blanco Fl. Filip. ed. 3, *pl. 336*, non Benth.

Derris thyrsiflora F.-Vill. Nov. App. (1880) 68, non Benth.

LUZON, Province of Zambales, *Merrill 2189, Hallier s. n., For. Bur. 701½ Curran:* Province of Bataan, *Bur. Sci. 590 Mangubat, Merrill 2561, For. Bur. 12931 Alvarez, Whitford 1261:* Province of Rizal, *Bur. Sci. 6758 Robinson, For. Bur. 476 Ahern's collector, Guerrero 30, Merrill 1734, 2841, Decades Philip. Forest Fl. no. 213:* Manila, *Alberto s. n.* MINDORO, *Merrill 948, For. Bur. 12229 Rosenbluth.* NEGROS, *For. Bur. 5568 Everett, Whitford 1638.* MINDANAO, Province of Surigao, *Ahern 359.*

Native names: *Balitos, baloc-baloc* (Negros); *tibalao, balanti, bagarilao, asin-asinanan* (Rizal); *dugo-rogo, rugo-rugo* (Bataan); *bala-y-lamoc* (Zambales); *silasila,* ex Blanco.

Blanco's *Pterocarpus diadelphus* was referred by F.-Villar to *Derris thyrsiflora* Benth., a species that does not occur in the area from which Blanco secured his material. His description, although short, applies unmistakably to the species commonly known as *Derris sinuata* Thw., and *diadelphus,* being the earliest valid specific name is here adopted. The species is common in the region from which Blanco secured most of his material, and flowers from April to June.

Ceylon and India to the Malay Peninsula and Archipelago, and Indo-China.

2. **Derris thyrsiflora** Benth. in Journ. Linn. Soc. Bot. **4** (1860) Suppl. 249; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 100.

Millettia thyrsiflora Benth. Pl. Jungh. (1851) 249.

BASILAN, *Hallier s. n.*

The specimen is in fruit, and is probably referable here; flowering specimens may lead to a different disposition of it.

Nicobar Islands, the Malay Peninsula, Sumatra, and Java.

3. **Derris polyantha** Perk. Frag. Fl. Philip. (1904) 83.

LUZON, Province of Pampanga, *Merrill 1457:* Province of Rizal, *Merrill 1692. For. Bur. 430, 2653 Ahern's collector, Bur. Sci. 2188 Ramos, Decades Philip. Forest Fl. no. 180 Ahern's collector.*

Native names: *Tugle* (Rizal); *malagogong-dapo* (Pampanga).

This is described as having the vexillary filament free, which would place the species in the § *Aganope;* I have examined a number of flowers from both specimens cited in the original description, and find the vexillary filament more or less united with the others. In Rizal Province the bark of this vine is used to stupefy fish.

Endemic.

4. **Derris cumingii** Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 104; Vid. Phan. Cuming. Philip. (1885) 109; Perk. Frag. Fl. Philip. (1904) 82.

Derris cumingiana Vid. Rev. Pl. Vasc. Filip. (1886) 113.

LUZON, Province of Ilocos Norte, *Cuming 1208* (cotype): Province of Benguet, *For. Bur. 5133 Curran:* Province of Zambales, *Bur. Sci. 1922 Foxworthy:* Province of Rizal, *For. Bur. 7034, 7037 Curran, For. Bur. 1129, 1140, 2986 Ahern's collector, Merrill 1867, 2824.*

Native names: *Malacaguios, malacadios* (Bataan).

Endemic.

5. **Derris scandens** (Roxb.) Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 103; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 240; F.-Vill. Nov. App. (1880) 68; Vid. Sinopsis Atlas (1883) *t. 41, fig. F;* Rev. Pl. Vasc. Filip. (1886) 112.

Dalbergia scandens Roxb. Pl. Coromandel 2 (1798) *t. 192.*

Dalbergia timoriensis DC. Prodr. 2 (1825) 417.

Galedupa frutescens Blanco Fl. Filip. (1837) 559, ed. 2 (1845) 391, ed. 3, 2:354; Naves l. c. ed. 3, *pl. 232.*

Deguelia timoriensis Taub. in Engl. & Prantl. Nat. Pflanzenfam. 3[3] (1891) 345.

LUZON, Province of Benguet, *Elmer 6463, Williams 1053, Bur. Sci. 3451 Mearns:* Province of Pangasinan, *Alberto 4:* Province of Zambales, *Bur. Sci. 4807 Ramos:* Province of Nueva Ecija, *Cuming 1420:* Province of Bulacan, *Bur. Sci. 6112 Robinson & Merritt:* Province of Rizal, *Bur. Sci. 3287 Ramos:* Province of Cavite, *Merrill 4185.* MINDORO, *Bur. Sci. 1535 Bermejos, For. Bur. 6183 Merritt.* PALAWAN, *Bur. Sci. 891 Foxworthy.* BURIAS, *For. Bur. 1723 Clark.* TABLAS, *McGregor 339.* SAMAR, *Cuming 1699.* NEGROS, *For. Bur. 13588 Meyer & Foxworthy.* MINDANAO, District of Davao, *Williams 2857.*

Native names: *Lapac* (Burias); *malasaga,* ex Blanco.

India to southern China through Malaya to northern Australia.

6. **Derris philippinensis** sp. nov.

Derris multiflora var.? *longifolia* Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 108; Vid. Phan. Cuming. Philip. (1885) 109, non *D. longifolia* Benth.

Derris multiflora Vid. Rev. Pl. Vasc. Filip. (1886) 112; Perk. Frag. Fl. Philip. (1904) 83; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66, non Benth.

Derris multiflora var.? *longifolia* Benth. was based on *Cuming 1162,* but Bentham states that the two specimens, *Junghuhn,* from Java, type of the species, and *Cuming 1162,* from the Philippines, type of the variety *longifolia,* were without fruit, and hence it was difficult to judge the affinities of the two specimens. Recently material has been collected in the Philippines, in fruit, that in all vegetative characters matches *Cuming 1162,* which shows that the var. *longifolia* belongs in the § *Brachypterum,* and must be closely allied to *Derris scandens;* as the pods of *D. multiflora* are described, from Junghuhn's notes, as "oblique rotundato," it is evident that the Javan and Philippine plants must be very different. Accordingly the Philippine form is here treated as a distinct species.

Scandent, glabrous except the inflorescence. Leaflets 5 to 7, narrowly ovate to oblong-lanceolate, 7 to 13 cm long, 2.5 to 4.5 cm wide, base rounded or acute, the apex strongly subcaudate-acuminate, the acumen blunt. Racemes shorter than or nearly equaling the leaves, axillary, rather slender, somewhat pubescent, many flowered. Flowers white, about 1 cm long. Pod thin, narrowly oblong to oblong-lanceolate, blunt, 4 to 8 cm long, 1 to 1.5 cm wide, very slightly falcate, the wing 1.5 to 2 mm wide.

LUZON, Province of Ilocos Norte, *Cuming 1162, Bur. Sci. 7635 Ramos:* Province of Benguet, *Elmer 6177:* Province of Rizal, *Merrill 5045:* Province of Bataan, *Topping 535, Williams 714:* Province of Tayabas, *Merrill 1969.*

Manifestly closely allied to *Derris scandens* (Roxb.) Benth., differing especially in its less numerous, much larger leaves, and its pods not distinctly narrowed at both ends as in that species.

7. **Derris elegans** (Grah.) Benth. Pl. Jungh. (1852) 252; Journ. Linn. Soc. Bot. 4 (1860) Suppl. 109; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 252; King ex Prain in Journ. As. Soc. Bot. 66 [2] (1897) 103.

Pongamia elegans Grah. in Wall. Cat. (1832) no. 7540.

CULION, *Merrill 666.* NEGROS, *For. Bur. 7249 Everett.* LEYTE, *Elmer 7162.* MINDANAO, District of Zamboanga, *Williams 2398:* Lake Lanao, *For. Bur. 3919 Hutchinson, Mrs. Clemens 434, 484,* and several sheets without number.

The material here referred to *Derris elegans* seems to differ from the typical form of that species, as described, in being nearly glabrous, and having longer racemes. One specimen cited above, *Merrill 666,* was referred by Doctor Perkins to *Derris uliginosa.* Although *D. elegans* is manifestly allied to that species, it is very different in its leaves and inflorescence, and, as noted by Prain, can always be distinguished by its stipellate leaves.

Tenasserim, the Andaman Islands, Malay Peninsula, and Sumatra.

8. **Derris trifoliata** Lour. Fl. Cochinch. (1790) 433.

Robinia uliginosa Roxb. ex Willd. Sp. Pl. 3 (1800) 1133.

Dalbergia heterophylla Willd. l. c. 901.

Galedupa uliginosa Roxb. Hort. Beng. (1814) 53, Fl. Ind. 3 (1832) 243.

Pongamia uliginosa DC. Prodr. 2 (1825) 416.

Pterocarpus frutescens Blanco Fl. Filip. (1837) 562, ed. 2 (1845) 392, ed. 3, 2: 356; Naves l. c. ed. 3, *pl. 159.*

Derris uliginosa Benth. Pl. Jungh. (1852) 252, Journ. Linn. Soc. Bot. 4 (1860) Suppl. 107; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 241; F.-Vill. Nov. App. (1880) 68; Vid. Rev. Pl. Vasc. Filip. (1886) 113.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4001 Fénix.* LUZON, Province of Zambales, *Hallier s. n.:* Manila, *Elmer 5503:* Province of Bataan, *For. Bur. 6356 Curran:* Province of Tayabas, *Whitford 581, 597, 759:* Province of Camarines, *For. Bur. 12278, 12288 Curran.* POLILLO, *Bur. Sci. 6988 Robinson.* MINDORO, *For Bur. 5516 Merritt, Bur. Sci. 921 Mangubat.* PALAWAN, *Bur. Sci. 831 Foxworthy.* CEBU, *Bur. Sci. 1715 McGregor.* MINDANAO, District of Zamboanga, *Hallier s. n.:* District of Cotabato, *Mrs. Clemens 810:* District of Davao, *Williams 2746, Copeland 352.* BASILAN, *For. Bur. 3973 Hutchinson.*

Native names: *Mangasin* (Tayabas); *tuba-tuba* (Basilan); *sila-sila,* ex Blanco: *hiñgasin, hiñgasinan* (Panay), ex F.-Villar.

A species confined to salt water or brackish swamps along the seashore

and tidal rivers; common throughout the littoral districts in the Philippines. Eastern Africa through India to Formosa, Malaya, and Polynesia.

Dr. A. B. Rendle informs me that the type of Loureiro's *Derris trifoliata* is not preserved in the British Museum; I consider the identity of this species and *Derris uliginosa* Roxb. to be unquestionable, and the earliest name is hence adopted. The next older name appears to be *Dalbergia heterophylla* Willd., and the type of this has been examined by Dr. H. Harms at my request, who reports that it is quite the same as *Derris uliginosa* Roxb.

The genus *Derris* was based by Loureiro on two species, *D. pinnata*, and *D. trifoliata;* the former is a *Dalbergia*, and is identical with *D. tamarindifolia* Roxb. (see p. 96). Under the circumstances it would be illogical to consider the first species described as the type of the genus, thus making *Dalbergia* and *Derris* synonymous, and hence the second species, *Derris trifoliata* Lour., must be adopted as the generic type.

9. **Derris micans** Perk. Frag. Fl. Philip. (1904) 82.

Luzon, Province of Rizal, *Merrill 2284, Bur. Sci. 4584 Ramos, For. Bur. 2892 Ahern's collector.*

Endemic.

10. **Derris mindorensis** Perk. l. c.

Mindoro, *Merrill 953.*

Endemic.

Whether or not *Derris micans* and *D. mindorensis* are distinct is doubtful. The type of the former is a fruiting specimen, nearly glabrous in all parts, and that of the latter is a flowering specimen, the under surface of the leaflets and the inflorescence somewhat pubescent. The vegetative characters are very similar in both, and flowering specimens from near the type locality of *D. micans* (*For. Bur. 2892 Ahern's collector*), have pubescent leaflets and panicles as in *D. mindorensis.* A larger series of specimens will be necessary to determine the exact relationships between the two forms. A cotype of *D. mindorensis* has been determined by Mr. Rolfe at Kew as *D. ferruginea* Benth., and it may be the same as the specimen collected by Vidal and so reported by Ceron.[51]

11. **Derris lianoides** Elmer Leafl. Philip. Bot. 1 (1907) 228.

Luzon, Province of Tayabas, *Elmer 7443, 9339, For. Bur. 10159 Curran:* Province of Rizal, *For. Bur. 2681 Ahern's collector.* Mindanao, Lake Lanao, *Mrs. Clemens 537* and several sheets without number: Province of Misamis, Mount Malindang, *For. Bur. 4775 Mearns & Hutchinson.*

This species belongs in the § *Paraderris,* and is apparently closely allied to *D. montana* Jungh., of Java, and to *D. malaccensis* Prain, of the Malay Peninsula. It differs from both in its smaller leaflets, and from the latter, at least, also in its narrower pods which are 5 to 8 cm long and 1.5 to 2 cm wide.

12. **Derris elliptica** (Roxb.) Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 111; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 243; F.-Vill. Nov. App. (1880) 68; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 106; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66.

Galedupa elliptica Roxb. Hort. Beng. (1814) 53, nomen, Fl. Ind. 3 (1832) 242.
Cylista piscatoria Blanco Fl. Filip. (1837) 589.
Galactia ? terminaliflora Blanco l. c. ed. 2 (1845) 411, ed. 3, 2: 390.
Millettia splendens F.-Vill. Nov. App. (1880) 59.

[51] Cat. Pl. Herb. (Manila) (1892) 66.

Millettia piscatoria Merr. in Govt. Lab. Publ. (Philip.) **27** (1905) 411, l. c. **29** (1905) 18.

LUZON, Province of Rizal, *Decades Philip. Forest Fl. no. 176,* as *Millettia, For. Bur. 473, 1164 Ahern's collector, Bur. Sci. 4570 Ramos:* Province of Bataan, *Whitford 60:* Province of Laguna, *Elmer:* Province of Tayabas, *For. Bur. 11108 Curran.* MINDORO, *McGregor 154, Merrill 4043.* MINDANAO, Lake Lanao, *Mrs. Clemens 410:* District of Davao, *Williams 2788, 2909.*

Native names: *Tibanglan* (Rizal); *tubli,* ex Blanco.

Chittagong and Tenasserim through the Malay Peninsula to Sumatra, Java, New Guinea and the Bismarck Archipelago.

There are apparently several other species of the genus represented in the materials before me, but most of the forms not classified are represented by flowering specimens only. As it is practically impossible in many cases definitely to determine, in the absence of fruit, whether the plant being dealt with is a *Derris* or a *Millettia,* I have refrained from describing any of these forms, with the hope that eventually additional material will be secured that will enable us satisfactorily to place the forms now represented only by flowering specimens.

The generic name *Derris* Lour. (1790) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress. O. Kuntze has referred all the species to *Pterocarpus,* and Taubert has adopted the genus *Deguelia* Aubl. (1775). Two other earlier names are *Salkan* Adans., and *Solori* Adans. (1763), the latter two being synonyms of *Derris,* as shown by Prain, and not referable to *Dalbergia,* where they have been placed by most authors.

DOUBTFUL AND EXCLUDED SPECIES.

DERRIS DISCOLOR Benth.; Ceron Cat. Pl. Herb. (Manila) (1892) 67. A species of doubtful status from Sikkim and Silhet. The Philippine record is probably due to an erroneously identified plant; it was based on a specimen from Balabac Island, *Vidal 2665.*

DERRIS FERRUGINEA Benth.; Ceron l. c. 66. The Philippine record is based on *Vidal 2576* from the Province of Isabela, Luzon, a specimen of which is in the Kew Herbarium; this specimen is very similar to *D. mindorensis* Perk., but is slightly more pubescent. Material collected in Mindanao, *Bolster 356, 406,* insufficient for accurate identification, may be the same as Vidal's specimen. Whether or not the Philippine material is referable to *D. ferruginea* Benth., I am unable to determine at present. That species is supposed to extend from the eastern Himalayan region to Burma. See *D. mindorensis* Perk., above.

60. EUCHRESTA Benn.

1. **Euchresta horsfieldii** (Lesch.) Benn. Pl. Jav. Rar. (1840) 148, *t. 21;* Benth. in Journ. Linn. Soc. Bot. **4** (1860) Suppl. 118; Miq. Fl. Ind. Bat. **1**[1] (1855) 125; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 248; F.-Vill. Nov. App. (1880) 68; Ceron Cat. Pl. Herb. (Manila) (1892) 67.

Andira horsfieldii Lesch. in Ann. Mus. Paris **16** (1810) 481, *t. 12;* DC. Prodr. **2** (1825) 476.

LUZON, Province of Rizal, Mount Cayatang, *Bur. Sci. 2159 Ramos:* Province of Tayabas, Mount Banajao, *Bur. Sci. 2470 Foxworthy:* Province of Albay, Mount Mayon, *Bur. Sci. 6484 Robinson:* without definite locality, *Vidal 2622, Loher 2336* (in Herb. Kew.). NEGROS, Mount Canlaon, *For. Bur. 13674 Curran.*

Khasia Mountains and eastern India, Formosa, Luchu Archipelago, and Java.

61. INOCARPUS Forst.

1. **Inocarpus edulis** Forst. Char. Gen. (1776) 66, *t. 33;* F.-Vill. Nov. App. (1880) 362; Oliver in Hook. Ic. IV **9** (1889) *pl. 1837;* Perk. Frag. Fl. Philip. (1904) 21.

Bocoa edulis Baill. Adansonia **9** (1868–1870) 237.

Gajanus edulis O. Ktze. Rev. Gen. Pl. (1891) 189.

JOLO, *Warburg 14677,* in herb. Berol. PALMAS, *Merrill 5336.*

Malay Archipelago to Polynesia, frequently only cultivated, and only so found in the Philippines. Palmas Island, mentioned above, is really not a part of the Philippine group politically, although formerly so considered; it is a small island to the south-east of Mindanao, and belongs to the Dutch, being ruled as a dependency of Celebes.

Inocarpus edulis has been referred to *Bocoa*, the latter being the older generic name; De Dalla Torre & Harms, however, retain *Inocarpus* Forst., and *Bocoa* Aubl., as distinct genera.

62. PISUM Linn.

1. **Pisum sativum** Linn. Sp. Pl. (1753) 727; F.-Vill. Nov. App. (1880) 62.

LUZON, Manila, *Nieva 312.*

The common pea, introduced from Europe and cultivated only, properly having no place in the Philippine flora; locally known by one of its Spanish names, *chicharo.*

63. ABRUS Linn.

Pod oblong, turgid, 2.5 to 5 cm long, 3- to 6-seeded; seeds red and black. ..... 1. *A. precatorius*

Pod narrowly-oblong, thin, not turgid, 6 to 8 cm long, somewhat curved, 6- to 12-seeded; seeds black ..... 2. *A. laevigatus*

1. **Abrus precatorius** Linn. Syst. Nat. ed. 12 (1767) 472; Blanco Fl. Filip. (1837) 565, ed. 2 (1845) 394, ed. 3, **2:** 361; Naves l. c. ed. 3, *pl. 156;* Miq. Fl. Ind. Bat. **1**[1] (1855) 159; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 175; F.-Vill. Nov. App. (1880) 62.

Glycine abrus Linn. Sp. Pl. (1753) 753.

Abrus abrus W. F. Wight in Contr. U. S. Nat. Herb. **9** (1905) 172.

BATANES ISLANDS, Sabtan, *Bur. Sci. 3729 Fénix.* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4028 Fénix.* LUZON, Province of Cagayan, *For. Bur. 14824 Darling, For. Bur. 16510 Bacani, For. Bur. 16749 Curran:* Province of Isabela, *Bur. Sci. 8111 Ramos:* Province of Ilocos Norte, *For. Bur. 14673 Darling, Bur. Sci. 2299 Mearns:* Province of Ilocos Sur, *Bur. Sci. 10079, 10093 McGregor:* Province of Union, *Elmer 5672:* Province of Pampanga, *Bolster 3, Merrill 1434:* Province of Rizal, *Bur. Sci. 1043 Ramos:* Province of Bataan, *For. Bur. 5981 Curran, Merrill 1588, Whitford s. n.:* Province of Cavite, *Baja 285:* Province of Tayabas, *Gregory 33, Merrill 1960.* POLILLO, *Bur. Sci. 6967 Robinson.* MINDORO, *Merrill 902.* TICAO, *For. Bur. 1059 Clark.* PANAY, *Copeland s. n.* MINDANAO, District of Davao, *Copeland 308:* Lake Lanao, *Mrs. Clemens s. n.* BASILAN, *Hallier s. n.*

Native names: *Saga, saga-saga* (Tayabas); *saga-baguin* (Polillo); *cansasaga* (Pampanga), *casasaga* (Bataan); *bugayong* (Ilocos, Union); *lasa* (Sabtan); other names, ex Blanco, *sagamamin, bangati, gicos-gicos, agaiyangyiang, manga-dolong, caloo, matangpune, aroyangyang.*

Widely distributed in the Philippines at low and medium altitudes; cosmopolitan in the Tropics.

2. **Abrus laevigatus** E. Mey. Comm. 1 (1835–37) 126; Harv. Fl. Cap. 2: 263.

Abrus pulchellus Wall. Cat. (1832) no. 5819, nomen; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 175; F.-Vill. Nov. App. (1880) 62; Perk. Frag. Fl. Philip. (1904) 84; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 35.

LUZON, Province of Abra, *Bur. Sci. 7281 Ramos:* Province of Benguet, *Williams 1415:* Province of Zambales, *Hallier s. n.:* Province of Bulacan, *Yoder 48:* Province of Bataan, *Copeland 293, For. Bur. 2068 Borden, Whitford 1034, Williams 76.*

India and Ceylon to the Malay Peninsula and Archipelago; also in tropical and southern Africa.

EXCLUDED SPECIES.

ABRUS FRUTICULOSUS Wall.; F.-Vill. Nov. App. (1880) 62. A species of British India, probably credited to the Philippines by F.-Villar on erroneously identified material.

64. CLITORIA Linn.

1. **Clitoria ternatea** Linn. Sp. Pl. (1753) 753; DC. Prodr. 2 (1825) 233; Blanco Fl. Filip. (1837) 590, ed. 2 (1845) 412, ed. 3, 2: 391; Naves l. c. ed. 3, *pl. 301;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 208.

Clitoria philippensis Perr. Mém. Linn. Soc. Paris 2 (1824) 111; C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 305.

LUZON, Province of Cagayan, *For. Bur. 16743 Curran:* Province of Abra, *Bur. Sci. 7297 Ramos:* Province of Ilocos Norte, *For. Bur. 19045 Darling, Bur. Sci. 2223 Mearns:* Province of Ilocos Sur, *For. Bur. 14075 Merritt & Darling:* Province of Union, *Elmer 5576:* Province of Pangasinan, *Bur. Sci. 4848, 4886, 4951 Ramos, Merrill 2875:* Province of Pampanga, *Merrill 1430:* Province of Laguna, *Williams 2057, 3071:* Manila, *Merrill 3439, McGregor 46, Favila 51, Cuzner 14:* Province of Bataan, *Merrill 1580.* LUBANG, *Merrill 969.* PALAWAN, *Bur. Sci. 199, 200 Bermejos, For. Bur. 4163, 4192 Curran.* CEBU, *Brown 5.* MINDANAO, District of Davao, *Copeland 449.*

Widely distributed and abundant in the Philippines at low altitudes in thickets, etc.; commonly cultivated. Both the blue and white-flowered forms represented in the material cited above; throughout the Tropics in gardens and as an escape.

65. CENTROSEMA Benth.

1. **Centrosema plumieri** (Turp.) Benth. in Ann. Wien. Mus. 2 (1838) 118; F.-Vill. Nov. App. (1880) 65; Usteri Beitr. Ken. Philip. Veg. (1905) 115.

Clitoria plumieri Turp. in Pers. Syn. 2 (1807) 303; DC. Prodr. 2 (1825) 234; Naves in Blanco Fl. Filip. ed. 3, *pl. 455.*

Bradburya plumieri O. Kuntze Rev. Gen. Pl. (1891) 164.

CEBU, *Bur. Sci. 1735 McGregor, Hallier s. n.*

A native of tropical America, introduced in the Philippines; it is not known whether the species is spontaneous or only cultivated in the Archipelago.

Bradburya Raf. (1817), and *Vexillaria* Hoffmg. (1824), are both older than *Centrosema,* the latter name being first used by DeCandolle, in 1825, as a section of *Clitoria. Centrosema* is, however, here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

66. **DUMASIA** DC.

1. **Dumasia villosa** DC. Mém. Leg. (1825) 257, *t. 44*, Prodr. **2** (1825) 241; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 183.

Rhynchosia ? henryi Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 196.

LUZON, Province of Benguet, Bugias, *Merrill 4671;* Mount Santo Tomas (Tonglon), *Williams 1412.*

Himalayan region to southern China, Java, Madagascar, and Natal.

The Philippine specimens differ from Asiatic material in our herbarium (*Henry 9238*, Yunnan, China, and *Meebold 5343*, Manipur, India) in some slight characters, being less villous, and with smaller leaflets. I can, however, detect no specific differentiating characters in the material before me.

67. **SHUTERIA** W. & A.

1. **Shuteria vestita** (Grah.) W. & A. Prodr. (1834) 207; Benth. Pl. Jungh. (1852) 232; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 181; Rolfe in Journ. Bot. **23** (1885) 212; Vidal Rev. Pl. Vasc. Filip. (1886) 109.

Glycine vestita Grah. in Wall. Cat. (1832) no. 5512.

LUZON, District of Bontoc, *For. Bur. 18388 Alvarez:* Province of Benguet, *Elmer 6075, Topping 98, Bur. Sci. 2793 Mearns, Williams 1538, Merrill 4797; For. Bur. 15939 Bacani, Bur. Sci. 5521 Ramos, For. Bur. 16221 Curran, Merritt, & Zschokke.*

India and Ceylon to southern China.

The Philippine material matches Chinese specimens, so named, closely, but is apparently somewhat different from Indian material. A critical examination of the Philippine and Chinese plants and comparison of the same with a large series of Indian specimens will be necessary to determine whether or not more than one species is represented.

68. **GLYCINE** Linn.

1. **Glycine tomentosa** Benth. Fl. Austral. **2** (1864) 245; Rolfe in Journ. Bot. **23** (1885) 212; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 189; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 109.

LUZON, Province of Ilocos Norte, *Cuming 1238.*

Southern China and Australia.

GLYCINE HISPIDA (Moench.) Maxim. is represented among our Philippine material by a single specimen from plants cultivated for experimental purposes in Manila, *Cuzner 49.* This Asiatic species properly has no place in the Philippine flora, and is apparently not cultivated by the natives. The beans are imported from Amoy in considerable quantities by the Chinese in Manila.

EXCLUDED SPECIES.

GLYCINE JAVANICA Linn.; F.-Vill. Nov. App.. (1880) 62.

I have seen no Philippine material representing this species; it extends from tropical Africa to India and Ceylon, and is also found in Java.

69. **TERAMNUS** Sw.

1. **Teramnus labialis** (Linn. f.) Spreng. Syst. **3** (1826) 235; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 184; F.-Vill. Nov. App. (1880) 63; Vid. Rev. Pl. Vasc. Filip. (1886) 109; Perk. Frag. Fl. Philip. (1904) 84.

Glycine labialis Linn. f. Suppl. (1774) 325.

LUZON, Province of Cagayan, *For. Bur. 16655 Bacani:* Province of Ilocos Norte, *For. Bur. 14677 Darling, Bur. Sci. 2277 Mearns:* Province of Union, *Elmer 5586:*

Province of Pangasinan, *Bur. Sci. 4927 Ramos:* Province of Bulacan, *Yoder 44:* Province of Batangas, *Marave 165:* Province of Laguna, *Bur. Sci. 6026 Robinson:* Province of Bataan, *Merrill 1592, Williams 268:* Province of Rizal, *Bur. Sci. 6521 Robinson, Merrill 5071, Bur. Sci. 2050 Ramos:* Manila, *Santiago 59.* CEBU, *Barrow 15.* BASILAN, *DeVore & Hoover 45.*

Widely distributed in the Philippines at low altitudes; throughout the Tropics.

The Philippine specimens appear to be nearer to the variety *mollis* (Benth.) Baker, than to the typical form; all the specimens cited above, that are in fruit, have the pods appressed-strigose, while in the typical form they are described as glabrous.

70. ERYTHRINA Linn.

Pods turgid and seed bearing throughout their length, the basal portion not flattened.

Calyx spathaceous, oblique, not at all 2-lipped, splitting to the base down the back § STENOTROPIS..... 1. *E. indica*

Calyx campanulate, subequally 2-lipped, not splitting to the base § MICROPTERYX.

Leaflets ovate or rhomboid-ovate, acuminate, submembranaceous, pubescent beneath; pods slender, about 8 mm wide, with a long, very slender stipe, the valves very thinly coriaceous..... 2. *E. stipitata*

Leaflets oblong to oblong-ovate, obtuse or acute, sometimes slightly acuminate, coriaceous or subcoriaceous; pods stout, about 1.5 cm wide, the stipe stout, the valves very thickly coriaceous..... 3. *E. fusca*

Pods flat, seedless and indehiscent in their lower half § HYPAPHORUS. 4. *E. subumbrans*

1. **Erythrina indica** Lam. Encycl. **2** (1785) 391; DC. Prodr. **2** (1825) 412; Miq. Fl. Ind. Bat. **1**[1] (1855) 207; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 188; F.-Vill. Nov. App. (1880) 63; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 66.

Erythrina corallodendrum orientalis Linn. Sp. Pl. (1753) 706.

Erythrina picta Linn. Sp. Pl. ed. 2 (1763) 993 p. p., quoad syn. *Gelala albá* Rumph.

Erythrina orientalis Murr. in Comm. Gotting. **8** (1787) 35, *pl. 1.*

Erythrina lithosperma Blume Cat. Gew. Buitenz. (1823) 92; Hassk. Pl. Jav. Rar. (1848) 381, non Miq. Fl. Ind. Bat. **1**[1] (1855) 209.

Erythrina carnea Blanco Fl. Filip. (1837) 564, ed. 2 (1845) 393, ed. 3, **2**: 359; Naves l. c. ed. 3, *pl. 217*, non Dryand.

LUZON, Province of Cagayan, *For. Bur. 17131 Curran:* Province of Abra, *For. Bur. 14539 Darling:* Province of Union, *Elmer 5588:* Manila, *Decades Philip. Forest Fl. No. 277 Merrill:* Province of Bataan, *For. Bur. 1266, 1274 Borden, For. Bur. 2235 Meyer, For. Bur. 5935 Curran:* Province of Tayabas, *Whitford 684, Merrill 1904, 2039:* Province of Camarines, *Ahern 30.* MINDORO, *For Bur. 8770, 9695 Merritt.* PALAWAN, *For. Bur. 3557 Curran.* PANAY, *For. Bur. 115 Gammill, Copeland s. n.* MINDANAO, District of Davao, *Ahern 675;* Lake Lanao, *Mrs. Clemens 205.*

Quite universally known in the Philippines as *dap-dap;* in Abra as *dab-dub;* in Cagayan as *voc-voc* and *bag-bac.*

Common throughout the Philippines, especially along the seashore; frequently planted inland. India to southern China, Malaya, and Polynesia.

Erythrina indica Lam., includes, in part, *E. picta* Linn., the latter being much the earlier name. *Erythrina picta* Linn. was based in part on botanical material in Linnæus' hands, and in part on *Gelala alba* Rumph. Herb. Amboin. **2**: 234,

t. 77, but the description does not apply to the plant figured and described by Rumphius. It seems reasonable to consider that the specimen in the Linnean Herbarium represents the type of the species, and that he erred in referring to it Rumphius's *Gelala alba;* what the specimen in the Linnean Herbarium really represents can only be determined by an examination of the material. Specimens closely matching Rumphius' figure of *Gelala alba* are represented by *For. Bur. 3557 Curran* from Palawan, but in all respects other than the mottled leaves this specimen is typical *Erythrina indica* Lam. Baker[52] states "*E. picta* Linn. (Rumph. Amboin. *t.* 77) appears to be a mere form of this [*E. indica* Lam.], with variegated leaves."

2. Erythrina stipitata sp. nov. § Micropteryx.

Arbor circiter 10 m alta; ramulis vix aculeatis; foliis trifoliolatis, foliolis junioribus ovatis vel rhomboideis, acuminatis, submembranaceis, subtus pallidis, puberulis; racemis simplicibus, circiter 15 cm longis; floribus 3 cm longis; leguminibus 5 ad 9 cm longis, circiter 8 mm latis, subcylindraceis, vix torulosis, longissime tenuiter stipitatis, valvis tenue coriaceis, reticulatis.

A tree about 10 m high. Trunk with rather thin, yellowish bark, and with very large, scattered, subpyramidal spines which are from 1 to 1.5 cm high, and nearly as thick at the base, minutely apiculate. Branches glabrous, unarmed, the ultimate branchlets stout, often slightly puberulent. Leaves trifoliolate, all parts, when very young, densely puberulent; leaflets pale beneath, pubescent, the terminal one rhomboid-ovate, acuminate, the lateral ones ovate, up to 5 cm long (probably considerably larger when mature). Flowers crimson, about 3 cm long, in many flowered racemes about 15 cm long, their pedicels about 5 mm long, solitary or two at a node. Calyx broadly campanulate, distinctly 2-lobed, about 6 mm long. Vexillum .3 cm long, 1.3 cm wide, about equally narrowed at both ends, scarcely clawed. Pod subcylindric; long-apiculate, 5 to 9 cm long, about 8 mm wide, glabrous or nearly so, dehiscent along the ventral suture, the pedicels slightly elongated, the calyx persistent; stipe very slender, 1.5 to 2 cm long, about 1 mm thick; valves very thinly coriaceous, obscurely reticulate; seeds few, three or four, brown when nearly mature, about 7 mm long, and half as thick.

Lubang Island, near the town of Lubang, in open lands at sea level, with flowers and nearly mature fruits April 7, 1903, *Merrill 958.* Deciduous, with only immature leaves at this date.

This species is allied to *Erythrina suberosa* Roxb. of British India, but apparently most closely related to *E. microcarpa* Koord. & Val. of Java; from the latter it differs especially in its unarmed branches and branchlets, differently shaped seeds, and in its differently disposed flowers which in *E. microcarpa* are in racemosely disposed cymules, and in *E. stipitata* are in simple racemes.

[52] Hook. f. Fl. Brit. Ind. **2** (1876) 189.

3. **Erythrina fusca** Lour. Fl. Cochinch. (1790) 427; Miq. Fl. Ind. Bat. 1[1] (1855) 208.

Erythrina ovalifolia Roxb. Hort. Beng. (1814) 53, Fl. Ind. 3 (1832) 254; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 189; F.-Vill. Nov. App. (1880) 63; Perk. Frag. Fl. Philip. (1904) 85; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 72.

Erythrina picta Blanco Fl. Filip. (1837) 565, non Linn.

Erythrina caffra Blanco l. c. ed. 2 (1845) 394, ed. 3, 2:360; Naves l. c. *pl. 326*, non Thunb.

Luzon, Province of Ilocos Norte, *Bur. Sci. 2311 Mearns:* Province of Pangasinan, *For. Bur. 3655 Saroca:* Manila, *Marave 153, Merrill Decades Philip. Forest. Fl. No. 278:* Province of Bataan, *Williams 357, For. Bur. 6529 Curran.* Mindanao, Lake Lanao, *Mrs. Clemens 204.*

Native names: *Dapdap* (Bataan); *telbang* (Pangasinan); *anii* (Ilocos Norte).

Along streams in open lands at low altitudes; Assam and Bengal to Indo-China, the Malay Peninsula and Archipelago.

The reduction of *Erythrina ovalifolia* Roxb. to *E. fusca* Lour., the latter much the earlier, has not previously been suggested by any author known to me; I fail to find any constant characters for distinguishing the two.

4. **Erythrina subumbrans** (Hassk.) comb. nov.

Hypaphorus subumbrans Hassk. Retzia ed. nov. 198, fide Koord. & Val., Hort. Bogor. Descr. (1858) 197.

Erythrina secundiflora Hassk. Pl. Jav. Rar. (1848) 378, non Brotero.

Erythrina lithosperma Miq. Fl. Ind. Bat. 1[1] (1855) 209; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 190; F.-Vill. Nov. App. (1880) 63; Naves in Blanco Fl. Filip. ed. 3, *pl. 345;* Vidal Sinopsis Atlas (1883) *t. 41, fig. A*, Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 109; Perk. Frag. Fl. Philip. (1904) 85; Prain in Journ. As. Soc. Beng. 66[2] (1897) 73; Koord & Valet. Meded. 's Lands Plantent. 14 (1895) 64, non Blume.

Erythrina sumatrana Miq. Fl. Ind. Bat. Suppl. (1860–61) 304.

Erythrina hypaphorus Boerl. in Teysmannia 5: 20, fide Koord. & Valeton.

Luzon, Province of Abra, *For. Bur. 14570 Darling:* Province of Benguet, *Elmer 8666:* Manila, *For. Bur. 12470 Curran:* Province of Cavite, *For. Bur. 7693 Curran:* Province of Rizal, *For. Bur. 10014 Curran:* Province of Tayabas, *Merrill 1950.* Mindoro, *Whitford 1386.* Leyte, *Elmer 7132.* Mindanao, District of Cotabato, *Mrs. Clemens s. n.*

Native names: *Dapdap* (Manila, Cavite, Tayabas, Mindoro); *sablang* (Abra).

Indo-China to the Malay Peninsula and Archipelago.

What I consider to be the oldest valid name is here adopted for this species. It is the species usually known as *Erythrina lithosperma* Blume, but the original *E. lithosperma* Blume Cat. (1823) 92, *nomen nudum*, and later very fully described by Hasskarl[53] is *Erythrina indica* Lam., as noted by Koorders & Valeton,[54] while the *Erythrina lithosperma* Miq. Fl. Ind. Bat. 1[1] (1855) 209, is not at all Blume's species but is the form here considered as *E. subumbrans*. Prain[55] proposes to retain the species under the name of *E. lithosperma*, but with Miquel as its author instead of Blume, but to avoid confusion I consider it advisable to abandon the name altogether. Both the spiny form (var. *armata* Miq., and the spineless one (var. *inermis* Miq.) are represented in the material cited above.

[53] Pl. Jav. Rar. (1848) 381.

[54] Meded. 's Lands Plantent. 14 (1895) 58, 64.

[55] Journ. As. Soc. Beng. 66[2] (1897) 73.

71. **STRONGYLODON** Vog.

Racemes very long, pendent, exceeding 1 m in length ..... 1. *S. macrobotrys*
Racemes less than 40 cm in length, scarcely pendulous.
  Ovary densely pubescent.
    Flowers 3 cm long or somewhat less ..... 2. *S. elmeri*
    Flowers 4 to 5 cm long ..... 3. *S. zschokkei*
  Ovary glabrous.
    Flowers red ..... 4. *S. lucidus*
    Flowers green (color unknown in *S. crassifolius*).
      Nodes of the inflorescence produced into 1 to 2 cm long branchlets. 5. *S. caeruleus*
      Nodes of the inflorescence only very slightly produced.
        Ovules 1 or 2 ..... 6. *S. crassifolius.*
        Ovules 5 ..... 7. *S. pulcher*

1. **Strongylodon macrobotrys** A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 448, *t. 49;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66, 3 (1908) Bot. 81.

Strongylodon warburgii Perk. Frag. Fl. Philip. (1904) 85?

Luzon, Province of Laguna, Los Baños, *Wilkes Expedition* (type in U. S. National Herbarium), *Merrill 5114,* March, 1906; Paete-Piapi, *For. Bur. 9565 Curran,* March, 1908: Province of Bataan, *For. Bur. 6235, 6524 Curran, Williams 633, Whitford 67, 160, For. Bur. 2808 Meyer, Copeland s. n.:* Province of Tayabas, *Merrill 4070, Elmer 9336.* Mindoro, *McGregor 190, For. Bur. 12015 Merritt.*

Native names: *Tayabac, bayo-u* (Bataan); *buracan* (Mindoro).

Known only from Luzon and Mindoro, and a most striking species, growing usually in humid forests, ravines, etc., extending from slightly above sea level (Laguna, Mindoro), to an altitude of 1,000 m (Mount Mariveles, Bataan). The long, pendent, many-flowered racemes exceed 1 m in length, and the flowers are variously described as greenish-blue, nile-green, green, and verdigris; they are a very peculiar pallid greenish or bluish-green shade difficult to describe. Dried flowers appear as though they were tinged with purple, although in reality there is no trace of purple in the fresh flowers. The original description calls for reddish or purplish flowers, but as indicated by Gray, there were no notes with the specimen, and the color was probably estimated from the dried specimens. Fully grown flowers vary from 4 to 5 or 6 cm in length, or, if the keel be straightened out, sometimes 7 cm long. Doctor Perkins has described the flowers of *S. warburgii* as 8.5 cm long, but I have seen none as large as this, and the measurement may be due to a typographical error. I can not otherwise distinguish the latter species from *S. macrobotrys.* I have examined the type of *S. macrobotrys,* but not that of *S. warburgii.*

2. **Strongylodon elmeri** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 20.

Luzon, Province of Benguet, *Elmer 6260, 8984:* Province of Cagayan, *For. Bur. 16676 Bacani.*

Endemic.

3. **Strongylodon zschokkei** Elmer Leafl. Philip. Bot. 1 (1907) 297.

Luzon, Province of Benguet, *Elmer 8540* (cotype).

Apparently very closely allied to the preceding, and perhaps not specifically distinct; my material of *S. zschokkei* is so poor that it is difficult to determine the exact differences between it an *S. elmeri.* The flowers are described as having

a banner 4 cm long, and the style 5 cm long, but none of the flowers on the specimen before me, which are apparently immature, exceed 3 cm in length.

Endemic.

4. **Strongylodon lucidus** (Forst.) Seem. Fl. Vit. (1865–68) 61; Merr. in Philip. Journ. Sci. **2** (1907) Bot. 424.

Glycine lucida Forst. Prodr. (1786) 51.

Rhynchosia lucida DC. Prodr. **2** (1825) 387.

Strongylodon ruber Vog. in Linnaea **10** (1836) 585; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 446, *t. 48;* Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 191; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 69.

Balut Island, *Merrill 5411.*

Ceylon, Andaman Islands, New Guinea to the Fiji Islands and Hawaii.

5. **S. caeruleus** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 20.

Luzon, Province of Benguet, *Elmer 6097, 8908;* possibly also represented by *Topping 58,* and *Elmer 6438* from the same Province, and by *Bur. Sci. 3304 Ramos,* from Rizal Province, Luzon.

Endemic.

6. **Strongylodon crassifolius** Perk. Frag. Fl. Philip. (1904) 85.

Luzon, Province of Bataan, Mariveles, (*Warburg 12899*).

A species known to me only by description. The types of this, and of *S. warburgii,* are in the Berlin Herbarium, but at the time of my visit there in January, 1908, neither had been distributed into the herbarium, and were hence unavailable for study. Described as having long, circinnate tendrils, a character otherwise unknown in the genus.

Endemic.

7. **Strongylodon pulcher** C. B. Robinson in Philip. Journ. Sci. **3** (1908) Bot. 184.

Mindanao, District of Zamboanga, *Williams 2362:* Lake Lanao, *Mrs. Clemens 415, s. n.*

Endemic.

72. MUCUNA Adans.

Perennials; pods flat or cylindric, winged on both sides, the seeds large, flattened or globose, with a hilum extending round the greater part of their periphery (Subgen. Zoopthalmum).

Pods with plaits across their faces (§ Citta).

Pod 5 to 7 cm wide, with numerous, very irritating, brown hairs; flowers dark-purple ..... 1. *M. nigricans*

Pod 3 cm wide, with few and scarcely stinging hairs; flowers nearly white. 2. *M. curranii*

Pods without plaits across their faces (§ Carpopogon).

Pods flat, broad, glabrous, or with long stinging hairs.

Pods about 20 cm long, less than 1 cm thick, glabrous, distinctly reticulate, terminated by a slender 1 to 2 cm long acumen..... 3. *M. mindorensis*

Pods less than 15 cm long, rusty-hispid with stinging hairs, 1 to 1.5 cm thick, not reticulate, the tip rounded or obtuse, sometimes with a very short apiculus..... 4. *M. gigantea*

Pods cylindric, densely pubescent with very short, gray, nonirritating hairs. 5. *M. longipedunculata*

Annuals or perennials, with turgid, somewhat hooked pods, not winged; seeds small, oval, with a small lateral hilum (Subgen. STIZOLOBIUM).

Pods densely covered with brown, stiff, very irritating hairs.

Leaves densely gray-tomentose beneath, the leaflets mostly broader than long, the terminal one usually retuse, chartaceous ..... 6. *M. sericophylla*

Leaves slightly pubescent beneath, the leaflets longer than broad, acute or acuminate, membranaceous ..... 7. *M. pruriens*

Pods finely and softly gray-pubescent, the hairs not at all irritating, longitudinally ridged in the median portion..... 8. *M. nivea*

Pods densely and softly purplish-velvety, not or very obscurely longitudinally ridged ..... 9. *M. deeringiana*

Pods unknown; racemes about 13 cm long, and with the calyx yellow-tomentose with short hairs, and with interspersed longer ones; young shoots, petioles, and under surface of the leaflets ferruginous-tomentose; flowers 5.5 to 6.5 cm. long ..... 10. *M. aurea*

1. **Mucuna nigricans** (Lour.) Steud. Nom. ed. 2, **2** (1841) 163.

Citta nigricans Lour. Fl. Cochinch. (1790) 456.

Carpopogon imbricatum Roxb. Hort. Beng. (1814) 54, nomen.

Mucuna imbricata DC. Prodr. **2** (1825) 406; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 185; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 65; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 67.

Negretia urens Blanco Fl. Filip. (1837) 586, ed. 2 (1845) 409, ed. 3, **2**: 387.

Mucuna monosperma F.-Vill. Nov. App. (1880) 63, non DC.

Stizolobium imbricatum O. Ktze. Rev. Gen. Pl. (1891) 208.

Zoopthalmum nigricans Prain l. c. as syn.

LUZON, Province of Cagayan, *Bolster 126:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *Merrill 3914:* Province of Bataan, *Bur. Sci. 1885 Foxworthy, Whitford 1028, Merrill 3783, Williams 231:* Province of Tayabas, *Cuming 688.* POLILLO, *Bur. Sci. 6969 Robinson.* MINDORO, *For. Bur. 11455 Merritt.* LEYTE, *Elmer 7138.* MINDANAO, Province of Surigao, *Bolster 314:* District of Zamboanga, *For. Bur. 9093 Whitford:* District of Davao, *Copeland 944.*

Native names: *Duglo* (Bataan); *baluctot* (Polillo); *alilipai* (Zamboanga); *buquitquit, lipai,* ex Blanco.

Himalayan region to Indo-China and the Andaman Islands; probably also in the Malay Archipelago. Closely allied species are *M. junghuhniana* (O. Kuntze) Prain, of Java, and *M. cyanosperma* K. Sch. from the Moluccas.

2. **Mucuna curranii** Elmer Leafl. Philip. Bot. **1** (1907) 230.

LUZON, Province of Benguet, *Elmer 8442, Williams 1424, Merrill 4818, For. Bur. 5111 Curran,* locally known to the Igorots as *dungan.*

Endemic.

3. **Mucuna mindorensis** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 231.

Mucuna acuminata Merr. l. c. **1** (1906) Suppl. 196, non Grah.

MINDORO, *McGregor 322, 220, For. Bur. 6861 Merritt, Merrill 4069.* It is probably also represented by *For. Bur. 10289 Curran,* from Tayabas Province, Luzon, and *For. Bur. 2955 Ahern's collector,* from Rizal Province, Luzon, both without fruits.

Endemic.

4. **Mucuna gigantea** (Willd.) DC. Prodr. **2** (1825) 405; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 186; F.-Vill. Nov. App. (1880) 63; Vid. Rev. Pl. Vasc. Filip. (1886) 109; Perk. Frag. Fl. Philip. (1904) 86.

Dolichos giganteus Willd. Sp. Pl. **3** (1800) 1041.

Carpopogon giganteum Roxb. Hort. Beng. (1814) 54.

Stizolobium giganteum Spreng. Syst. **4** (1827) Cur. Post. 281.

Zoopthalmum giganteum Prain in Journ. As. Soc. Beng. **66**[2] (1897) 68, as syn.

LUZON, Province of Cagayan, *For. Bur. 16704 Bacani:* Province of Ilocos Norte, *Cuming 1087:* Province of Bataan, *For. Bur. 5976, 6381 Curran.* POLILLO, *Bur. Sci. 6868, 9260 Robinson.* MINDANAO, District of Davao, *Williams 2698, Copeland 622:* Province of Surigao, *Merrill 5438.*

Always found near the seashore; India, Indo-China, the Malay Peninsula and Archipelago, to Polynesia.

5. **Mucuna longipedunculata** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 18.

LUZON, Province of Benguet, *Elmer 8949a, 6233.* MINDANAO, Province of Surigao, *Bolster 394.*

The last specimen cited has mature pods which are cylindric, 16 cm long and 3.5 cm in diameter.

Endemic.

6. **Mucuna sericophylla** Perk. Frag. Fl. Philip. (1904) 86.

Mucuna luzoniensis Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 196.

LUZON, Province of Cagayan, *Warburg 12438* (type, in herb. Berol.): District of Lepanto, *Bur. Sci. 7046 Ramos:* Province of Union, *Elmer 5599* (type of *M. luzoniensis*): Province of Benguet, *Williams 1423, Elmer 8910:* Province of Pangasinan, *Cuming 954* (in herb. Kew.): Province of Zambales, *For. Bur. 5870 Curran.* MINDORO, *For. Bur. 6194, 6195 Merritt.* LEYTE, *Elmer 7247.* MINDANAO, Lake Lanao, *Mrs. Clemens 355, 882.*

The types of *Mucuna sericophylla* and *M. luzoniensis* are not identical, but additional material shows a number of intergrades, and I am now of the opinion that the species can not be distinguished from one another. The species shows some variation, but in all essential characters appears to be constant; the leaflets are not all emarginate, but frequently are blunt or acute, or even shortly apiculate-acuminate. It is manifestly allied to *M. pruriens.*

Endemic.

7. **Mucuna pruriens** (Linn.) DC. Prodr. **2** (1825) 405; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 187; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 68; F.-Vill. Nov. App. (1880) 63: Perk. Frag. Fl. Philip. (1904) 86.

Dolichos pruriens Linn. Syst. Nat. ed. 10 (1859) 1162.

Stizolobium pruriens Pers. Syn. **2** (1807) 299.

Carpopogon pruriens Roxb. Hort. Beng. (1814) 54.

Negretia pruriens Blanco Fl. Filip. ed. 2 (1845) 411, ed. 3, **2:** 389: Naves l. c. ed. 3, *pl. 331.*

Mucuna atropurpurea F.-Vill. Nov. App. (1880) 63, non DC.

LUZON, Province of Laguna, *Bur. Sci. 6020 Robinson:* Province of Rizal, *Merrill s. n.:* Manila, from cultivated plants, seeds from Rizal Province, *Merrill 6348, s. n., Shaw 219.*

Native names: *Nipai, lipai* (Bataan, Laguna).

In various forms throughout the Tropics; the above form India to Malaya.

8. **Mucuna nivea** (Roxb.) W. & A. Prodr. (1834) 255; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 188; F.-Vill. Nov. App. (1880) 63; Piper & Tracy in U. S. Dept. Agr. Bureau Plant Industry Bull. **179** (1910) 15, *pl. 4, fig. A.*

Carpopogon niveum Roxb. Hort. Beng. (1814) 54, *nomen nudum,* Fl. Ind. **3** (1832) 285.

Negretia mitis Blanco Fl. Filip. (1837) 588, ed. 2 (1845) 410, ed. 3, **2**:388; Naves l. c. ed. 3, *pl. 405,* non Ruiz & Pav.

Mucuna lyonii Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 197.

LUZON, Province of Cagayan, *For. Bur. 18596 Alvarez:* Manila, from cultivated plants, seeds from Pampanga Province, *Lyon s. n.*

Native name: *Sabual* (Pampanga).

Messrs. Piper and Tracy have recently studied the various cultivated forms of *Mucuna*, under the title "The Florida Velvet Bean and Related Plants" l. c., and have come to the conclusion that the Philippine *Mucuna lyonii* Merr., is identical with the Indian *M. niveum* W. & A., or as they prefer to call it, *Stizolobium niveum* (Roxb.) O. Ktze. They are undoubtedly correct in the above conclusion, but I can not concur with them in the opinion that "*Mucuna nivea* DC." which is a *nomen nudum*, based on *Carpopogon niveum* Roxb. Hort. Beng. (1814) 54, *nomen nudum*, is a species distinct from *Mucuna nivea* W. & A. Under present rules DeCandolle's name, not being properly "published" has no standing. The chief character by which Messrs. Piper & Tracy attempt to separate "*Mucuna nivea* DC.," from *M. nivea* W. & A., is that the legumes, when ripe, are entirely free from pubescence, a character expressly stated by Roxburgh in the original description of his *Carpopogon niveum*, Fl. Ind. **3** (1832) 285, on which *Mucuna nivea* W. & A. was based.

India; cultivated in other warm countries.

9. **Mucuna deeringiana** (Bort) comb. nov.

Stizolobium deeringianum Bort U. S. Dept. Agr. Bureau Plant Ind. Bull. **141** (1909) 31, *pl. 2, 3.*

LUZON, Province of Pampanga, *Merrill s. n.:* Province of Bataan, Lamao, *For. Bur. 1817 Borden.*

The origin of the above species is unknown, and its status is not definitely known. The two Philippine specimens were undoubtedly raised from American seeds, the first from seeds distributed by the Philippine Bureau of Agriculture, while the second appeared in nursery beds at Lamao. For a history of the form see Bort, Katherine Stephens, "The Florida Velvet Bean and its History." [56] It is possible that the species is only a cultural form of *Mucuna nivea*, *M. velutina*, or some other species.

10. **Mucuna aurea** C. B. Rob. in Philip. Journ. Sci. **3** (1908) Bot. 183.

LUZON, Province of Benguet, *Williams 1292.*

Endemic.

This last species can not be placed in its proper section until fruits are secured; it is well characterized among the Philippine species by its ferruginous-tomentose indumentum.

The generic name *Mucuna* Adans. (1763) has been retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress. Older names are *Stizolobium* and *Zoopthalmum*, both of P. Browne (1756), and both of these have been taken up by various later authors. The whole subject has been well discussed by Prain,[57] who treats both P. Browne's names as subgenera of *Mucuna*, but expresses the opinion that both *Zoopthalmum* and *Stizolobium* will probably at an early date be again considered generically distinct.

EXCLUDED SPECIES.

MUCUNA CAPITATA W. & A.; F.-Vill. Nov. App. (1880) '63.

I have seen no Philippine material that I consider referable to this species; probably credited to the Philippines on an erroneous identification.

[56] U. S. Dept. Agr. Bureau of Plant Industry, Bull. **141** [3] (1909) 25–32.

[57] Journ. As. Soc. Beng. **66** [2] (1897) 404–407.

73. SPATHOLOBUS Hassk.

1. **Spatholobus gyrocarpus** (Wall.) Benth. Pl. Jungh. (1852) 238; Miq. Fl. Ind. Bat. **1** [1] (1855) 204; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 204; F.-Vill. Nov. App. (1880) 63; Vid. Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110; Perk. Frag. Fl. Philip. (1904) 87; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 76.

Butea gyrocarpa Wall. Cat. (1832) no. 5442.

LUZON, Province of Rizal, *Merrill 2685, Bur. Sci. 3268 Ramos, For. Bur. 464, 1149, 2957 Ahern's collector:* Province of Albay, *Cuming 945.*

Native name: *Ipal, ipales* (Rizal).

Penang and Perak.

A possible second species of the genus is represented by *Merrill 4002* from Atimonan, Tayabas Province, Luzon, but the fruits are dehiscent throughout their length, and contain four seeds; they are very similar to those of *Erythrina subumbrans.* As there is some chance that this number represents a mixture of material, the pods having been picked up from the ground, I do not consider it advisable to describe it at the present time.

74. GALACTIA P. Br.

1. **Galactia tenuiflora** (Klein) W. & A. Prodr. (1834) 206; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 192.

Glycine tenuiflora Klein ex Willd. Sp. Pl. **3** (1800) 1059; DC. Prodr. **2** (1825) 241.

LUZON, Province of Benguet, Kias, *Elmer 6613* (det. Prain): Province of Rizal, San Pedro Macati, *Shaw 388.*

India to Ceylon, Siam, tropical Africa, Malaya, and Australia; not previously reported from the Philippines.

75. DIOCLEA H. B. K.

Pods very densely and softly villous with long, spreading, persistent, ferruginous hairs ..... 1. *D. umbrina*

Pods slightly pubescent with short, appressed hairs, ultimately subglabrescent. 2. *D. reflexa*

1. **Dioclea umbrina** Elmer Leafl. Philip. Bot. **1** (1907) 224.

LUZON, Province of Benguet, *Elmer 8922:* Province of Rizal, *Merrill 1621.* LEYTE, *Elmer 8922.*

A species well characterized by its very densely ferruginous-villous pods. The flowers are as yet unknown, and it is possible that the species does not belong to the genus.

Endemic.

2. **Dioclea reflexa** Hook. f. Niger Flora (1849) 306; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 196; Rolfe in Journ. Bot. **23** (1885) 212; Vidal Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110; Prain in Journ. As. Soc. Beng. **66** [2] (1897) 59, Ann. Bot. Gard. Calcutta **9** [1] (1901) 30, *pl. 40;* Perk. Frag. Fl. Philip. (1904) 87.

LUZON, Province of Laguna, *Cuming 521:* Province of Rizal, *For. Bur. 3333 Ahern's collector.* MINDORO, *Merrill 4033, McGregor 227, For. Bur. 6876 Merritt.*

Widely distributed in the Tropics of the world.

76. LUZONIA Elmer.

1. **Luzonia purpurea** Elmer Leafl. Philip. Bot. 1 (1907) 220.

Dioclea sp.? Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

LUZON, Province of Tayabas, Lucban, *Elmer 9013*, May, 1907: Province of Bataan, Lamao River, *For. Bur. 3050 Borden*, May, 1905.

This endemic, monotypic genus is undoubtedly closely allied to *Canavalia*, and even more closely to *Dioclea*, to the latter genus especially by its staminal characters, the fertile anthers being reduced to six. It seems, however, to be distinguished from *Dioclea*, as well as from *Canavalia*, by its calyx characters. The probability of the plant representing a new genus was suggested to me by Doctor Prain in January, 1906, to whom a duplicate of Borden's specimen had been sent for identification. Regarding this specimen, Doctor Prain wrote as follows: "I do not agree with you in thinking that it is a *Dioclea*. The leaf is wonderfully suggestive of *Canavalia*, but I should not be surprised, when fruit is found, that you have near a new genus. It should be in the neighborhood of *Dioclea* and *Canavalia*." The fruit is as yet unknown.

77. MACROPSYCHANTHUS Harms.

Leaves nearly glabrous; pod rather flat, about 18 cm long..... 1. *M. mindanaensis*
Leaves rather strongly ferruginous-pubescent; pod turgid, mostly 10 to 15 cm long ..... 2. *M. ferrugineus*

1. **Macropsychanthus mindanaensis** sp. nov.

Frutex scandens, glabra vel subglabra; foliis trifoliolatis, foliolis ovato-ellipticis, subglabris, valde acuminatis; stipulis basi productis; racemis elongatis, multifloris; floribus albido-purpureis, circiter 3 cm longis, vexillis basi auriculatis; staminibus omnibus fertilibus; leguminibus 18 cm longis, 5 cm latis, pubescentibus.

A woody vine reaching a height of 10 m, nearly glabrous. Stems grayish, glabrous, terete, lenticellate, the shoots also glabrous. Petioles 12 to 15 cm long, slightly hairy or ultimately glabrous, each subtended by a pair of pubescent stipules which are attached by their central part, the lower part produced at nearly right angles from the upper, both free parts less than 5 mm long. Leaflets ovate-elliptic, chartaceous, somewhat shining when dry, of the same color on both surfaces, glabrous, or the lower surface with a few scattered hairs especially on the midrib and nerves, 10 to 15 cm long, 6 to 10 cm wide, base rounded or acute, the apex abruptly and rather slenderly acuminate; nerves 8 to 10 on each side of the midrib, prominent; petiolules pubescent, 5 to 8 mm long; stipels acicular, pubescent, nearly as long as the petiolules. Racemes up to 40 cm in length, glabrous below, above, at least when young, ferruginous-pubescent, flower-bearing in the upper half, the nodes produced as club-shaped branchlets which become stout and woody in fruit and nearly 1 cm long, each bearing several flowers, and each subtended by a linear-lanceolate, deciduous, acuminate, 5 mm long, pubescent bract. Flowers about 3 cm long, pale-purple. Calyx 1.5 cm long, pubescent externally, villous within, the lower three teeth oblong-ovate, 8 mm long, 4 mm wide, blunt, the upper two connate into a 5 mm long and 7 mm wide lobe

which is retuse at the apex. Petals all clawed, and about equal in length; standard with a 7 mm long claw, the lamina orbicular, retuse, 2.5 cm wide, with two auricular callosities at the base. Stamens all fertile, the vexillary filament free at the base, united above with the others. Ovary densely villous. Pods (immature) about 18 cm long, 5 cm wide, rather flat, not much thickened on the dorsal suture, ferruginous-pubescent, the apex acuminate. Seeds 3 to 5.

MINDANAO, Province of Surigao, *Bolster 330*, with flowers and immature fruits, April, May, 1906, in forests along streams at an altitude of about 60 m.

Of the two species here described, the above approaches closest to the type of the genus, *Macropsychanthus lauterbachii* Harms, of New Guinea. It is, however, quite distinct from that species.

2. **Macropsychanthus ferrugineus** sp. nov.

Frutex scandens, ramulis foliis inflorescentiisque ferrugineo-pubescentibus; foliolis ovatis vel elliptico-ovatis, acuminatis, stipitellatis; stipulis basi productis; floribus 2.5 cm longis; staminibus omnibus fertilibus; leguminibus usque ad 18 cm longis, 7 cm latis; seminibus 2.5 cm diametro, hilo lineari semicinctis.

A scandent woody vine reaching a height of at least 10 m, the stems grayish-brown, terete, lenticellate, glabrous, the younger parts rather strongly ferruginous-villous as are the petioles and leaflets. Leaves very similar to those of Philippine *Dioclea reflexa;* petiole about 15 cm long, subtended by a pair of 1 to 1.5 cm long stipules attached by their median portions, and about equally long above and below the point of attachment; leaflets ovate to elliptic-ovate, subcoriaceous, 10 to 20 cm long, 5 to 13 cm wide, ferruginous-villous on both surfaces; nerves 11 to 13 on each side of the midrib; petiolules about 5 mm long; stipels acicular, villous, about as long as the petiolules. Racemes 30 to 40 cm long, ferruginous-pubescent, flower-bearing in the upper half, the nodes produced as short, club-shaped branchlets, each bearing several flowers, each node subtended by a lanceolate, deciduous, ferruginous bract about 7 mm long. Flowers 2.5 cm long, pink. Calyx 1.5 cm long, ferruginous-pubescent outside, somewhat villous within, the lower three teeth oblong-ovate, about 7 mm long, 5 mm wide, the upper two connate into a 6 mm long and wide lobe, cleft about one-third its length into divergent teeth. Petals all clawed; standard 2.5 cm long, the claw stout, about 7 mm. long, the lamina orbicular, 2 cm wide, retuse, not auricled at the base but with a thickened swelling; wings equalling the standard, about 8 mm wide, decurrent-acuminate at the base; keel as long as the other petals, incurved, hooded, 1 cm wide (not spread), decurrent-acuminate at the base. Staminal-tube curved, the filaments all antheriferous, the vexillary one free at the base, somewhat united with the others above. Ovary villous. Pod almost woody, turgid, 11 to 18 cm long, 6 to 7 cm wide, at first ferruginous-pubescent, when very old glabrous or nearly so, nearly 1 cm thick on the dorsal suture, at least 2 cm thick in the middle. Seeds

two or three, nearly circular in outline, 2.5 cm in diameter, 2 cm thick, smooth, shining, brown, mottled with darker color, the hilum linear, extending more than one-half around the seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 419*, and three sheets without number.

This species in superficial characters is very similar to *Dioclea reflexa* Hook. f., and was at first considered by me to belong in that genus, as an intermediate between the sections *Pachylobium* and *Eudioclea*, having 10 fertile stamens and a linear hilum; it seems, however, to be referable to the above genus, in spite of its similarity to *Dioclea reflexa*. The flowers of both the above species are only about one-half as large as those of *M. lauterbachii* Harms, but structurally they appear to be about the same. If the two species here described are correctly treated generically, then *Macropsychanthus* must be very closely allied to *Dioclea*.

This previously monotypic genus was based on *Macropsychanthus lauterbachii* Harms in Schumann & Lauterbach Fl. Deutsch. Schutzgeb. Südsee (1901) 366, *pl. 10*, and the presence of additional representatives in the Philippines is a case of interest from the point of geographical distribution.

78. PUERARIA DC.

Branches 4-angled ..... 1. *P. tetragona*
Branches terete.
Flowers in simple racemes, medium sized; leaflets stipellate.
Stipules not produced below their point of attachment; leaflets mostly medium-sized or small, rounded, acute, or apiculate-acuminate; pods slightly hairy, subglabrescent, less than 5 mm wide..... 2. *P. phaseoloides*
Stipules peltate, much produced below their point of attachment; leaflets ample, acuminate, rarely lobed; pods densely hirsute, about 8 mm wide. 3. *P. thunbergiana*
Flowers small, in dense, spike-like racemes which are paniculately arranged; leaflets not stipellate, strongly acuminate..... 4. *P. warburgii*

1. Pueraria tetragona sp. nov.

Scandens, plus minus hirsuta, ramis quadrangulatis; foliolis ovatis vel oblongo-ovatis, integris, submembranaceis, acuminatis, lateralibus plus minus obliquis; stipulis lanceolatis, deciduis, basi non productis; racemis axillaribus, solitariis, quam petioli brevioribus; floribus albis, circiter 7 mm longis; leguminibus lineari-oblongis, leviter hirsutis, 5 mm latis.

A scandent annual, the stems distinctly 4-angled, hirsute, especially on the angles, with reflexed, brownish hairs. Leaves alternate, trifoliolate, the petiole slightly hirsute, 5 to 8 cm long, produced 1 to 2 cm above the insertion of the lateral leaflets; leaflets submembranaceous, green and somewhat shining when dry, both surfaces with very few, scattered hairs, entire, base rounded or subacute, apex sharply acuminate, the lateral ones somewhat inequilateral, 7 to 12 cm long, 3 to 6.5 cm wide, with a pair of subbasal nerves, and three of four nerves on each side of the midrib above the basal pair; petiolules 2 to 3 mm long, hirsute, the stipels acicular, about 1 mm long; stipules lanceolate, acuminate, less than 5 mm long. Racemes axillary, solitary, 2 to 3 cm long, the

rachis, bracts, bracteoles, and calyces hirsute with elongated, scattered, usually appressed hairs. Flowers white, about 7 mm long, usually in pairs from a swollen node, each node subtended by two or three narrowly lanceolate, acuminate, hirsute, 2 to 3 mm long bracts; pedicels 2 to 3 mm long, with a pair of bracteoles, similar to the bracts, near the apex. Calyx 5 mm long, the lower three teeth lanceolate, acuminate, 3 mm long, subequal, the upper two connate for one-half their length into a deeply cleft lobe as long as the lower teeth. Standard 6 mm long, obovate-orbicular, rounded, clawed, not auricled or callose; wings equalling the standard, adherent to the keel and geniculate, with an oblong, 8 mm long, obtuse auricle at the geniculation; keel as long as the other petals, very similar in size and shape to the wings, auricled. Stamens all fertile, the vexillary one united with the rest. Ovary linear-lanceolate, sessile, slightly hirsute; style glabrous, slightly curved. Pods flat, 4 to 5 cm long, about 5 mm wide, hirsute with scattered hairs, acuminate, slightly constricted between the seeds, each containing from 6 to 8, compressed, brown seeds about 2.5 mm long.

PALAWAN, near Puerto Princesa, *Bur. Sci. 295 Bermejos*, January, 1906. A species readily recognizable by its 4-angled stems.

2. **Pueraria phaseoloides** (Roxb.) Benth. in Journ. Linn. Soc. Bot. **9** (1865) 125; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 199; F.-Vill. Nov. App. (1880) 64; Perk. Frag. Fl. Philip. (1904) 87; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 67.

Dolichos phaseoloides Roxb. Fl. Ind. **3** (1832) 316.

Pachyrhizus teres Blanco Fl. Filip. (1837) 580.

Pachyrhizus montanus Blanco l. c. ed. 2 (1845) 406, ed 3, **2**:381.

Dioscorea bolojonica Blanco l. c. ed. 1 (1837) 800, ed. 2 (1845) 551, ed. 3, **3**:208.

LUZON, Province of Benguet, *For. Bur. 15704 Merritt & Darling:* Province of Tarlac, *Merrill 3620:* Province of Bulacan, *Yoder 42:* Province of Bataan, *Merrill 1547, 3778, For. Bur. 2340 Borden, Elmer 6719.* MINDANAO, Lake Lanao, *Mrs. Clemens 640.*

India to southern China, the Malay Peninsula and Archipelago.

3. **Pueraria thunbergiana** (S. & Z.) Benth. in Journ. Linn. Soc. Bot. **9** (1865) 122; Forbes & Hemsl. l. c. **23** (1887) 191; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 410.

Dolichos hirsutus Thunb. in Trans. Linn. Soc. **2** (1794) 237, non *Pueraria hirsuta* Kurz (1873).

Pachyrhizus thunbergianus S. & Z. Fl. Jap. Fam. Nat. **2** (1846) 113.

Neustanthus chinensis Benth. Fl. Hongk. (1861) 86.

BATANES ISLANDS, Batan, *Bur. Sci. 3833 Fénix.* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4116 Fénix.* LUZON, Province of Benguet, *Elmer 6600:* Province of Tayabas, *Bur. Sci. 6803 Robinson:* BANTON, *McGregor 347.* NEGROS, *For. Bur. 13712, 17339 Curran.*

India to Korea and Japan, south to Formosa; possibly also in the Buru Archipelago.

The specimen from Buru Island mentioned by Forbes & Hemsley may be referable to *P. textilis* Laut. & K. Sch., rather than to *P. thunbergiana.* The former is described as having sessile flowers, but in all the material of *P. thunbergiana*

I have examined the flowers are pedicelled. Prain[58] asserts that with the abundant material now available for study it is imposible to distinguish *Pueraria thompsoni* Benth. from *P. thunbergiana* Benth., even as a variety.

4. **Pueraria warburgii** Perk. Frag. Fl. Philip. (1904) 87.

Glycine warburgii Merr. in Philip. Journ. Sci. **3** (1908) Bot. 231.

LUZON, Province of Albay, *For. Bur. 12392 Curran.* MINDANAO, District of Davao, Baganga, *Merrill 5430;* Santa Cruz, *Williams 2953;* Taumo, *Warburg 14664* (type in herb. Berol.!); *DeVore & Hoover 368.*

This species was previously transferred by me to *Glycine,* but I am now of the opinion that it belongs properly in the genus *Pueraria;* in young specimens the swollen nodes of the inflorescence are not very evident, but are distinct in more mature material. The same species, or a closely allied one, is also found in Celebes; see Perkins l. c.

79. CANAVALIA DC. (*Canavali* Adans.).

Pod turgid, often nearly flat along the dorsal suture, 10 cm long or less, about 4.5 cm wide; leaflets acuminate..... 1. *C. turgida*

Pod usually flat, if turgid then usually less than 3 cm wide, or if 4.5 cm wide, then exceeding 20 cm in length.

Leaflets broad and rounded at the apex, or even retuse; a littoral species. 2. *C. lineata*

Leaflets acuminate; inland species, wild and cultivated.

Pod less than 20 cm in length and 3 cm in width..... 3. *C. ensiformis*

Pod 25 to 30 cm long, 4 to 5 cm wide..... 4. *C. gladiata*

1. **Canavalia turgida** Grah. in Wall. Cat. (1832) no. 5534; Miq. Fl. Ind. Bat. **1**[1] (1855) 215; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 417; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 81, 410.

Canavalia ensiformis var. *turgida* Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 196; F.-Vill. Nov. App. (1880) 64.

Canavalia virosa Naves in Blanco Fl. Filip. ed. 3, *pl. 319,* non W. & A.

Canavalia obtusifolia Prain in Journ. As. Soc. Beng. **66**[2] (1897) 63; Perk. Frag. Fl. Philip. (1904) 88; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 67, non DC.

BATANES ISLANDS, Batan, *Bur. Sci. 3189 Mearns:* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4071 Fénix.* LUZON, Province of Cagayan, *Bur. Sci. 7423 Ramos:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *Merrill 1424:* Province of Bataan, *For. Bur. 5931 Curran, Williams 317, Merrill 3172:* Province of Tayabas, *Whitford 707, Gregory 88.* POLILLO, *Bur. Sci. 9238 Robinson.* MINDORO, *Merrill 1292.* PALAWAN, *Merrill 700, Bur. Sci. 337 Bermejos.* BALABAC, *Bur. Sci. 494 Mangubat.* TICAO, *For. Bur. 1051 Clark.* NEGROS, *For. Bur. 5618 Everett.* PANAY, *Copeland 109.* MINDANAO, Lake Lanao, *Mrs. Clemens s. n.*

Native names: *Daluyduy* (Masbate); *danglin* (Mindoro).

Widely distributed in the Philippines, usually in thickets near the seashore, but scarcely growing on the beach; also on the borders of Lake Lanao, Mindanao (altitude about 800 m). Near the coast from India to southern China and Formosa through Malaya.

The synonymy of this species has been discussed by Prain,[59] who considers it under the name of *Canavalia turgida* Grah., but states that it is the plant to which the name *Canavalia obtusifolia* properly belongs. In this last conclusion I do not concur, for *Dolichos obtusifolius* Lam. was based primarily on the

[58] Journ. As. Soc. Beng. **66**[2] (1897) 419.

[59] L. c. 418.

references to Tournefort, Plumier, and Plukenet, and the description is manifestly not applicable to *Canavalia turgida* Grah., for the leaflets are described as very obtuse or almost round, and the pod as 6 to 8 inches long and 1½ inches wide; moreover Lamarck in adding the reference to Rheede, which is *Canavalia turgida* Grah., states "*forté Katu-tjandi* Rheed. Mal. 8. p. 83. t. 43." *Canavalia obtusifolia* DC. was based on *Dolichos obtusifolius* Lam., but DeCandolle reversed the order of citing synonyms, giving Rheede precedence; the name is, however, from Lamarck, and I consider *Canavalia obtusifolia* DC. to be typified by *Dolichos obtusifolius* Lam., not by *Katu-tjandi* Rheede. As to the specific name of the plant, *turgida* is probably the earliest valid one, although this point is not certain. In this connection Prain states: "It [*Canavalia turgida* Grah.] is, moreover, *Dolichos rotundifolius* Vahl, of which indeed DeCandolle had seen a specimen, thus confirming the conclusion that Roxburgh had already formed. This, from his drawing, is without any possibility of doubt Roxburgh's *Dolichos rotundifolius*." I have not seen the original description of *Dolichos rotundifolius* Vahl, but that given by Willdenow [60] does not seem to me to apply to *Canavalia turgida* Grah., as the leaflets are described as "ovali-subrotundis," and the pods as "Legumina tripollicaria unguem lata," in which characters Vahl's species appears to me to concur with *Canavalia lineata* (Thunb.) DC., rather than with *C. turgida* Grah.

2. **Canavalia lineata** (Thunb.) DC. Prodr. **2** (1825) 404; Prain in Journ. As. Soc. Beng. **66** [2] (1897) 63; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 410.

Dolichos lineatus Thunb. Fl. Jap. (1784) 280.

Canavalia obtusifolia DC. Prodr. **2** (1825) 404; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 196; F.-Vill. Nov. App. (1880) 64.

Dolichos obtusifolius Lam. Encycl. **2** (1786) 295.

Dolichos acinaciformis Blanco Fl. Filip. (1837) 578 (?), non Jacq.

Canavalia ensiformis Blanco l. c. ed. 2 (1845) 404, ed. 3, **2**:377 (?), non DC.

Batanes Islands, Batan, *Bur. Sci. 3680 Fénix.* Luzon, Province of Cagayan, *For. Bur. 16612 Curran:* Province of Union, *Elmer 5650:* Province of Zambales, *Merrill 342:* Province of Bataan, *Elmer 7033, Williams 319:* Manila, *McGregor 58, Torralba 207, Merrill 3423:* Province of Tayabas, *For. Bur. 9583 Curran, Whitford 840.* Mindanao, District of Davao, *Copeland 562:* Province of Surigao, *Allen 169, Long s. n.:* District of Zamboanga, *Hallier s. n.*

Along the seashore, usually growing in pure sand of the beach; coasts of India to Japan, through Malaya to Australia; also in tropical America, if the synonyms of DeCandolle and Lamarck are properly placed.

This species in floral characters is practically identical with *Canavalia turgida* Grah., but its pods are quite different, and it can always be distinguished by its rounded leaflets.

3. **Canavalia ensiformis** (Linn.) DC. Prodr. **2** (1825) 404; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 195; F.-Vill. Nov. App. (1880) 64; Perk. Frag. Fl. Philip. (1904) 88; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 67.

Dolichos ensiformis Linn. Sp. Pl. (1753) 725.

Luzon, Province of Cagayan, *Bolster 188:* District of Bontoc, *For. Bur. 16553 Curran & Merritt:* Province of Benguet, *For. Bur. 15883 Bacani:* Province of Union, *Fénix 12:* Province of Zambales, *Bur. Sci. 5119 Ramos:* Province of Pampanga, *Bur. Sci. 1943 Foxworthy:* Province of Pampanga, *Merrill s. n.:* Province of Bataan, *Elmer 6870, Merrill 1485, 1602, 3811, For. Bur. 79 Barnes, For. Bur. 2197 Meyer, Williams 532:* Province of Rizal, *Bur. Sci. 11 Foxworthy:* Manila, *Merrill 4094, Lyon s. n.* Lubang, *Merrill 963.*

[60] Sp. Pl. **3** (1800) 1040.

Widely distributed in the Philippines, some forms probably cultivated, but most of the specimens cited above from wild plants; Tropics of the world. Exceedingly variable.

4. **Canavalia gladiata** (Jacq.) DC. Prodr. **2** (1825) 404; Blanco Fl. Filip. ed. 2 (1845) 403, ed. 3, **2**:376; Naves l. c. ed. 3, *pl. 449*.

Dolichos gladiatus Jacq. Coll. **2** (1788) 276.

Dolichos ensiformis Blanco Fl. Filip. (1837) 577.

LUZON, Manila, *Merrill 3425, Bur. Sci. 5167 Ramos.* MINDANAO, Lake Lanao, *Mrs. Clemens 589, s. n.*

All the specimens cited above are from cultivated plants, and this form is unknown in the wild state in the Philippines. It is characterized by its very large pods, which are from 25 to 30 cm long, and about 5 cm wide.

I am not at all sure that the specimens above cited represent true *Canavalia gladiata* (Jacq.) DC., as I have not seen the original description of the species; it is reduced by most authors to *Canavalia lineata* (Linn.) DC.

Tropics of the world; certainly not a native of the Philippines.

80. CAJANUS DC.

1. **Cajanus indicus** Spreng. Syst. **3** (1826) 248; Miq. Fl. Ind. Bat. **1**[1] (1855) 174; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 217; F.-Vill. Nov. App. (1880) 66; Vid. Phan. Cuming. Philip. (1885) 109; Perk. Frag. Fl. Philip. (1904) 88; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 47.

Cytisus cajan Linn. Sp. Pl. (1753) 739; Blanco Fl. Filip. (1837) 597.

Cytisus pseudo-cajan Jacq. Hort. Vindob. **2** (1772) 54, *t. 119*.

Cajan inodorum Medic. in Vorles. Churpf. Phys. Ges. **2** (1787) 363.

Cajanus bicolor DC. Cat. Hort. Monsp. (1813) 85, Prodr. **2** (1825) 406; Blanco Fl. Filip. ed. 2 (1845) 416, ed. 3, **2**:396; Naves l. c. ed. 3, *pl. 167*.

Cajanus flavus DC. l. cc.

Cajan cajan Millsp. Field. Columb. Mus. Bot. **2** (1900) 53.

LUZON, Province of Cagayan, *For. Bur. 18604 Klemme, Merrill 191:* Province of Ilocos Norte, *Bur. Sci. 2293 Mearns:* Province of Benguet, *Bur. Sci. 5828 Ramos:* Province of Batangas, *Marave 167:* Province of Bataan, *For. Bur. 2337 Borden, For. Bur. 2266 Meyer:* Province of Rizal, *Bur. Sci. 2170 Ramos:* Manila, *Ocampo 268:* MINDORO, *For. Bur. 9872 Merritt, Bur. Sci. 6688 Robinson.* BUSUANGA, *For. Bur. 3535 Curran.* CULION, *Merrill 452.* BALABAC, *Bur. Sci. 385 Mangubat.* MASBATE, *Merrill 3055.* NEGROS, *Muñoz s. n.* MINDANAO, Lake Lanao, *Mrs. Clemens 207, 245:* District of Davao, *DeVore & Hoover 119.* BASILAN, *Hallier s. n.*

Native names: *Caguios* (Rizal, Batangas, Manila); *callos* (Balabac); *cadios* (Mindoro); *gablos* (Bataan); *cardis* (Ilocos, Cagayan); *tabios* (Masbate, Negros); *caldis* (Benguet).

Widely distributed in the Philippines and frequently cultivated; probably a native of the Old World, but now distributed throughout the Tropics of the world.

The most generally used specific name is here retained for this well-known species, although it is by no means the oldest. Following the Vienna rules, strictly, a new combination is necessary, whichever generic name is used. The oldest generic name is *Cajan* Adans. (1763), which was corrected by DeCandolle (1813) to *Cajanus*, and the case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress, although following strict priority, *Cajan* would be the correct generic name; both specific names proposed by DeCandolle are older than the one proposed by Sprengel, under which the species is generally

known. However, neither has been taken up, as there are still older ones available. According to the Vienna rules, duplicate binomials are inadmissible, and hence, if *Cajan* be accepted as the generic name, *Cajan cajan* (L.) Millsp. is inadmissible and a new combination would be necessary; the oldest specific name in this case would be from *Cytisus pseudo-cajan* Jacq. (1772). If, however, *Cajanus* be retained as the generic name, the oldest specific name would of necessity have to be taken from *Cytisus cajan* Linn., as the combination of the specific name *cajan* under the genus *Cajanus* hardly constitutes a duplicate binomial. Under present rules *Cajan cajan* is inadmissible, but *Cajanus cajan* is entirely proper and admissible (!), a very good illustration of inconsistency.

81. DUNBARIA W. & A.

Leaflets only slightly pubescent beneath, pale, but scarcely whitish.
1. *D. cumingiana*
Leaflets densely white-tomentose beneath..... 2. *D. merrillii*

1. **Dunbaria cumingiana** Benth. Pl. Jungh. (1852) 242; Miq. Fl. Ind. Bat. 1 [1] (1855) 177; F.-Vill. Nov. App. (1880) 66; Vid. Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110.

LUZON, Province of Benguet, *Bur. Sci. 5760 Ramos:* Province of Tayabas, *Cuming 819* (type in Herb. Kew.), *Elmer 7799, Bur. Sci. 6046 Robinson:* Province of Rizal, *Merrill 5074.*

Endemic.

2. **Dunbaria merrillii** Elmer Leafl. Philip. Bot. 1 (1907) 225 (as *Dumbaria*).

LUZON, Province of Benguet, *Elmer 8502* (type number): Province of Pangasinan, *Alberto 4:* Province of Cagayan, *Bur. Sci. 7411, 7872 Ramos.*

A species very closely allied to, and perhaps not specifically distinct from the preceding, distinguished, so far as I can determine from the material at hand, only by its more dense and whitish pubescence.

Endemic.

82. CANTHAROSPERMUM W. & A.

Petals marcescent; leaflets 4 to 7 cm long; pods 5 to 7 cm in length.. 1. *C. volubile*
Petals deciduous; leaflets 1.5 to 3 cm long; pods less than 3 cm long.
2. *C. scarabaeoides*

1. **Cantharospermum volubile** (Blanco) comb. nov.

Cytisus volubilis Blanco Fl. Filip. (1837) 599.

Cajanus volubilis Blanco l. c. ed. 2 (1845) 417, ed. 3, 2:398.

Dunbaria horsfieldii Miq. Fl. Ind. Bat. 1 [1] (1855) 179.

Atylosia mollis F.-Vill. Nov. App. (1880) 66; Vid. Sinopsis Atlas (1883) *t. 41, fig. E,* Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110; Perk. Frag. Fl. Philip. (1904) 88, non Benth.

Atylosia crassa Prain in Journ. As. Soc. Beng. 66 [2] (1897) 45.

LUZON, Province of Union, *Elmer 5612:* District of Lepanto, *Bur. Sci. 7025 Ramos:* Province of Rizal, *For. Bur. 2157 Ahern's collector.* UBIAN (Sulu Archipelago), *Merrill 5399.*

India, Indo-China, the Andaman Islands, and the Malay Archipelago.

In regard to the specific name for this species, *volubile,* being by far the oldest is here adopted. Blanco's description of *Cytisus volubilis,* although short, applies unmistakably to the material cited above. Prain [61] has called attention to the fact that *Atylosia mollis* Benth. is a mixture of two different species, and the name, derived from *Collaea mollis* Grah., is applicable only to a Himalayan plant.

[61] Journ. As. Soc. Beng. 66 [2] (1897) 46.

He adopts the name *Atylosia crassa*, based on the *nomen nudum*, *Dolichos crassus* Grah., for the Indo-Malayan form referred by most authors to *Atylosia mollis* Benth.

2. **Cantharospermum scarabaeoides** (Linn.) Baill. in Bull. Soc. Linn. Paris 1 (1883) 384 (*scarabaeoideum*).

Dolichos scarabaeoides Linn. Sp. Pl. (1753) 726.

Rhnychosia scarabaeoides DC. Prodr. 2 (1825) 387.

Atylosia scarabaeoides Benth. Pl. Jungh. (1852) 245; Miq. Fl. Ind. Bat. 1[1] (1855) 173; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 215; F.-Vill. Nov. App. (1880) 66; Vid. Phan. Cuming. Philip. (1885) 109; Perk. Frag. Fl. Philip. (1904) 88.

LUZON, Province of Cagayan, *For. Bur. 18613 Klemme:* District of Abra, *Bur. Sci. 7118 Ramos:* Province of Benguet, *Williams 1418:* Province of Union, *Elmer 5703:* Province of Pampanga, *Merrill 1431:* Province of Bulacan, *Yoder 140:* Province of Rizal, *Cuzner 28.* MINDORO, *Bur. Sci. 6659 Robinson.* MASBATE, *Merrill 3397.* MINDANAO, Lake Lanao, *Mrs. Clemens 774:* District of Davao, *DeVore & Hoover 104.*

Widely distributed in the Philippines at low altitudes in open grass-lands; India, Indo-China, southern China, Malaya, Mariannes and Mascarene Islands.

The generic name *Cantharospermum* W. & A. has only page preference over *Atylosia* W. & A., and the latter is by far the more commonly used one. The fact that *Atylosia* was not included in the list of *nomina conservanda* of the Vienna Botanical Congress is an excellent illustration of the inconsistency of that list.

83. RHYNCHOSIA Lour.

1. **Rhynchosia calosperma** Warb. in Engl. Bot. Jahrb. 12 (1891) 314; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 370; Perk. Frag. Fl. Philip. (1904) 88.

LUZON, Province of Pampanga, *Merrill 1443*, locally known as *balabalatungan*.

New Guinea, the Bismarck Archipelago, and the Key Islands.

I have followed Perkins in this identification; the type of the species has not been seen by me.

DOUBTFUL AND EXCLUDED SPECIES.

RHYNCHOSIA FRIDERICIANA (Weinm.) DC. Prodr. 2 (1825) 387; F.-Vill. Nov. App. (1880) 67.

Glycine fridericiana Weinm. in Flora 4 (1821) 29.

This species was described from specimens cultivated in Russia from seeds said to have been received from the Philippines, and I have been unable to determine its status from the short description available here. M. C. DeCandolle informs me that there is no specimen in the DeCandolle Herbarium, and Dr. A. Fischer von Waldheim, Director of the Botanical Garden at St. Petersburg, informs me that it is unrepresented in the Herbarium of that Institution.

RHYNCHOSIA VISCOSA DC.; F.-Vill. Nov. App. (1880) 66.

RHYNCHOSIA DENSIFLORA DC.; F.-Vill. l. c. 67.

RHYNCHOSIA MINIMA DC.; F.-Vill. l. c. 66.

The above three species were credited to the Philippines by F.-Villar, but no Philippine material has been seen by me, and accordingly they are not admitted here.

The oldest name for the genus is *Dolicholus* Medic. (1787), but *Rhynchosia* Lour. (1790) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

84. ERIOSEMA DC.

1. **Eriosema chinense** Vog. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 31; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 219; F.-Vill. Nov. App. (1880) 66; Vid. Rev. Pl. Vasc. Filip. (1886) 111.

Crotalaria tuberosa Ham. in Don Prodr. (1825) 241, non *Eriosema tuberosum* A. Rich. (1847).

LUZON, Province of Cagayan, *Bur. Sci. 7891 Ramos:* Province of Isabela, *Bur. Sci. 7982 Ramos:* District of Lepanto, *Merrill 4463:* Province of Benguet, *Bur. Sci. 5327 Ramos, For. Bur. 5109, 5131 Curran, Bur. Sci. 2474, 2736, 2769 Mearns. Elmer 6371:* Province of Nueva Vizcaya, *Merrill 402.* SEMERARA, *Merrill 4135.*

India to southern China, the Malay Peninsula and Archipelago, to northern Australia.

85. FLEMINGIA Roxb.

Leaves 1-foliolate; flowers in small cymules enclosed by large, folded, persistent bracts, and arranged in racemes longer than the leaves..... 1. *F. strobilifera*
Leaves 3-foliolate; flowers racemose or paniculate, the bracts small, deciduous.
  Flowers arranged in lax, spreading, racemose panicles..... 2. *F. lineata*
  Flowers in very dense, congested, spike-like racemes, or panicled racemes.
    Leaflets oblong, scarcely narrowed at the apex, rounded, or apiculate; plant decumbent or prostrate ..... 3. *F. philippinensis*
    Leaflets gradually narrowed to the acuminate or acute apex; plants erect or suberect.
      Leaves slightly pubescent beneath..... 4. *F. macrophylla*
      Leaves rather densely and softly villous beneath..... 5. *F. cumingiana*

1. **Flemingia strobilifera** (Linn.) R. Br. in Ait. Hort. Kew. ed. 2, **4** (1812) 350; DC. Prodr. **2** (1825) 351; Miq. Fl. Ind. Bat. 1[1] (1855) 161; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 227; F.-Vill. Nov. App. (1880) 67; Vid. Sinopsis Atlas (1883) *t. 40, fig. E,* Rev. Pl. Vasc. Filip. (1886) 111.

Hedysarum strobiliferum Linn. Sp. Pl. (1753) 764.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2273 Mearns:* Province of Union, *Elmer 5557:* Province of Pangasinan, *For. Bur. 3652 Saroca:* Province of Pampanga, *Merrill 1435, Feliciano 290:* Province of Rizal, *Merrill 1335:* Manila, *Abella 104:* Province of Bataan, *Whitford 47, Merrill 1589:* Province of Tayabas, *Merrill 1896.* PANAY, *Copeland s. n.* CULION, *Merrill 439.* BALABAC, *Bur. Sci. 501 Mangubat.* MINDANAO, District of Zamboanga, *For. Bur. 9254 Whitford & Hutchinson.* BASILAN, *DeVore & Hoover 23.*

Native names: *Copa-copa* (Pangasinan); *paking, pakayam* (Pampanga); *payang-payang* (Rizal); *paraparanahan, panapanalahan* (Bataan, Tayabas); *pirangan* (Balabac); *caliacai* (Zamboanga, Basilan).

India to southern China, the Malay Peninsula and Archipelago; introduced in Mauritius and the West Indies.

2. **Flemingia lineata** (Linn.) Roxb. Hort. Beng. (1814) 56, Fl. Ind. **3** (1832) 341; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 228; F.-Vill. Nov. App. (1880) 67; Usteri Beitr. Ken. Philip. Veg. (1905) 116.

Hedysarum lineatum Linn. Syst. ed. 10 (1759) 1170.

Flemingia blancoana Llanos Frag. (1851) 81; Blanco Fl. Filip. ed. 3, 4[1]:62.

LUZON, Province of Bulacan, *Mrs. Templeton.*

India and Ceylon through Malaya to northern Australia; not reported from the Malay Peninsula.

3. **Flemingia philippinensis** Merr. & Rolfe in Philip. Journ. Sci. **3** (1908) Bot. 103.

Luzon, District of Bontoc, *For. Bur. 16541 Curran:* District of Lepanto, *Merrill 4460.*

Endemic.

4. **Fleminga macrophylla** (Willd.) O. Kuntze ex Prain in Journ. As. Soc. Beng. **66** [2] (1897) 440, in nota.

Crotalaria macrophylla Willd. Sp. Pl. **3** (1800) 982.

Flemingia congesta Roxb. ex Ait. Hort. Kew. ed. 2, **4** (1812) 349; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 228, pro parte; F.-Vill. Nov. App. (1880) 67; Vid. Rev. Pl. Vasc. Filip. (1886) 111.

Rhynchosia sericea Vid. Sinopsis Atlas (1883) *t. 40, f. D.!;* F.-Vill. Nov. App. (1880) 67, prob., non Span.

Moghania macrophylla O. Kuntze Rev. Gen. Pl. (1891) 199.

Luzon, Province of Benguet, *Elmer 6241, For. Bur. 16224 Curran, Merritt, & Zschokke:* Province of Laguna, *For. Bur. 8867 Curran:* Province of Pampanga, *Merrill 1454:* Province of Rizal, *Merrill 1342:* Province of Bataan, *Whitford 76.* Culion, *Merrill 687.* Mindanao, Lake Lanao, *Mrs. Clemens 825.*

India to southern China and Malaya.

Flemingia congesta Roxb., as interpreted by Baker in Hooker's "Flora of British India," has been separated by Prain [62] into no less than six species, and two others, considered by Baker as synonyms of *F. wallichii* W. & A., are regarded by Prain as distinct, and are placed by him with the segregates from *F. congesta.* Incidentally Doctor Prain credits O. Kuntze with the new combination *Flemingia macrophylla,* but Kuntze originally made the transfer to *Moghania,* not to *Flemingia.* At my request Dr. H. Harms has compared the Philippine material with Willdenow's type, and writes as follows: "I have compared the specimen in Willdenow's Herbarium, no. 13260, named *Crotalaria macrophylla* Willd., with some Philippine specimens (i.e., Cuming's) of *Flemingia congesta* Roxb., and I think that they are identical; indeed I do not see any differences between the specimens, so that Willdenow's name must be admitted as the oldest for the species, according to Doctor Kuntze's statements. * * * The Philippine specimens agree better with Willdenow's type than do several of the Indian specimens, in our herbarium, referred to *F. congesta* Roxb."

5. **Flemingia cumingiana** Benth. Pl. Jungh. (1852) 245; Miq. Fl. Ind. Bat. 1[1] (1855) 67; F.-Vill. Nov. App. (1880) 67.

Philippines, without locality, *Cuming s. n.* in Herb. Kew. (type).

The type impresses me as being a rather densely pubescent form of the preceding species, and *F. cumingiana* may ultimately prove not to be separable from that. I am disposed to refer to *F. cumingiana* the following specimens, although some of them have considerably larger leaflets than has the type of the species: Luzon, Province of Abra, *Bur. Sci. 7130 Ramos:* Province of Bulacan, *Yoder 152:* Province of Bataan, *Merrill 1601.*

Endemic.

Flemingia involucrata Benth. is recorded from the Philippines by F.-Villar, Nov. App. 67; it extends from India to Java, but I have seen no Philippine specimens.

Flemingia Roxb. is here retained as the name for this genus, although O. Kuntze has adopted the generic name *Moghania* St. Hil. (1813), in which he has been followed by Taubert in Engler & Prantl's "Natürlichen Pflanzenfamilien." Kuntze asserts that *Flemingia* was not published until 1819, (1814, *nomen*

[62] Journ. As. Soc. Beng. **66** [2] (1897) 439.

nudum), but "Index Kewensis" gives the place of publication as volume four of the second edition of Aiton's "Hortus Kewensis," the date of which is given by Pritzel as 1812; this proves to be a valid publication and, if the dates are correct, then *Flemingia* has priority over *Moghania*. The case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress, although DeDalla Torre & Harms in their "Genera Siphonogamarum" accept *Flemingia* Roxb. in preference to *Moghania* St. Hil., giving the date of publication of the former as 1812.

86. PHASEOLUS Linn.

Stipules small, basifixed.
  Scandent; pods glabrous.
    Flowers less than 8 mm long; petals puberulent externally, greenish-yellow; pods broad, flattened, 1.5 to 2 cm wide..... 1. *P. lunatus*
    Flowers about 2.5 cm long; petals glabrous, pink to purple; pods less than 1 cm wide, subtorulose between the seeds..... 2. *P. adenanthus*
  Erect; pods appressed-pubescent, about 4 mm wide; flowers dark-purple. 3. *P. semierectus*

Stipules produced below the point of insertion; petals yellow, glabrous.
  Leaflets linear-lanceolate to lanceolate, mostly less than 1 cm in width; pods glabrous or somewhat strigose..... 4. *P. minimus*
  Leaflets ovate, oblong-ovate or orbicular-ovate exceeding 2 or 3 cm. in width.
    Pods glabrous; leaflets usually repand or slightly lobed..... 5. *P. calcaratus*
    Pods pubescent.
      Erect or scandent; leaflets pubescent or glabrous, not lobed, acute, obtuse, or slightly acuminate, cultivated..... 6. *P. radiatus*
      Scandent; fulvous-pubescent; leaflets rather strongly acuminate, lobed or repand ..... 7. *P. sublobatus*

1. **Phaseolus lunatus** Linn. Sp. Pl. (1753) 724; Blanco Fl. Filip. (1837) 573, ed. 2 (1845) 400, ed. 3, **2:** 370; Naves l. c. ed. 3, *pl. 352;* Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 200.

Phaseolus inamoenus Blanco Fl. Filip. (1837) 271, ed. 2 (1845) 399 (err. typ. *inamatus*), ed. 3, **2:** 368, non (?) Linn.

Phaseolus vexillatus Blanco l. c. ed. 1, 574, non Linn.

Phaseolus vulgaris Blanco l. c. ed. 2 (1845) 401, ed. 3, **2:** 371, non Linn.

Phaseolus ilocanus Blanco l. c. ed. 1, (1837) 572.

Phaseolus tunkinensis Blanco l. c. ed. 2 (1845) 399, ed. 3, **2:**369; Naves l. c. ed. 3, *pl. 369*, non (?) Lour.

LUZON, Province of Cagayan, *For. Bur. 16768 Curran:* Province of Ilocos Norte, *Bur. Sci. 7615 Ramos, Bur. Sci. 2279 Mearns:* Province of Abra. *For. Bur. 14651 Darling:* Province of Benguet, *For. Bur. 16220, 16223 Curran, Merritt, & Zschokke:* Province of Union, *For. Bur. 15710 Merritt & Darling:* Province of Nueva Ecija, *For. Bur. 8500 Curran:* Province of Pampanga, *Parker 39, Merrill s. n.:* Province of Batangas, *Cuzner 37*, Province of Rizal, *Bur. Sci. 2171 Ramos:* Province of Laguna, *Elmer, Hallier s. n.* PALAWAN, *Bur. Sci. 279 Bermejos.* MINDANAO, District of Davao, *DeVore & Hoover 235.*

Widely known in the Philippines as *patani,* other names given by Blanco being *buttingi* and *biringi* (Batangas), and the Spanish names *zabache* and *frijoles de Abra.*

A native of tropical America, now widely distributed in the Philippines, chiefly in cultivation; Tropics of the world.

I have followed F.-Villar in the reductions of the several species recognized by Blanco, as they all seem to be cultivated forms of this variable species.

F.-Villar refers Blanco's species to three varieties of *P. lunatus* Linn., var. *inaemoenus* (L.) F.-Vill., var. *tunkinensis* (Lour.) F.-Vill., and var. *xuaresii* (Zucc.) F.-Vill.

2. **Phaseolus adenanthus** G. W. F. Mey. Prim. Fl. Esseq. (1818) 239; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 200; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 49; Perk. Frag. Fl. Philip. (1904) 89.

Phaseolus rostratus Wall. Pl. As. Rar. **1** (1830) 50, *t. 63;* Usteri Beitr. Ken. Philip. Veg. (1905) 116.

LUZON, Province of Cagayan, *For. Bur. 16582 Curran:* Province of Ilocos Norte, *Bur. Sci. 2211, 2230, 2276, 2278 Mearns:* Province of Pangasinan, *Bur. Sci. 4950 Ramos, For. Bur. 8406 Curran & Merritt:* Province of Rizal, *Bur. Sci. 6527 Robinson:* Province of Laguna, *For. Bur. 8870 Curran:* Manila, *Carlos 136, Merrill 632, 3420, 3492, 4095, 4096, Hallier s. n., Zamora 60.* MINDANAO, District of Zamboanga, *Williams 2437.*

Native name: *Patanit-baquit* (Ilocos).

Cosmopolitan in the Tropics.

3. **Phaseolus semierectus** Linn. Mant. (1771) 100; Baker in Hook. f. Fl. Brit. Ind. **2** (1870) 201; Miq. Fl. Ind. Bat. **1** [1] (1855) 201; Perk. Frag. Fl. Philip. (1904) 89.

LUZON, Manila, *Merrill 30, Elmer 5536, McGregor 53, Cuzner 59, Airan 137.*

Abundant about Manila, and thoroughly naturalized, apparently of comparatively recent introduction, as it is not described by Blanco, nor listed by F.-Villar, as is also the case with the preceding species. A native of tropical America, now widely distributed in the Tropics of the world.

4. **Phaseolus minimus** Roxb. Fl. Ind. **3** (1832) 290; Benth. Fl. Hongk. (1861) 88; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 193.

LUZON, Province of Cagayan, *For. Bur. 16475 Bacani:* Province of Isabela, *Bur. Sci. 7987 Ramos:* Province of Benguet, *Williams 1408.* MINDANAO, District of Davao, *Copeland 544, DeVore & Hoover 167.*

A species well characterized by its narrow, elongated leaflets; previously known only from southern China.

5. **Phaseolus calcaratus** Roxb. Hort. Beng. (1814) 54, Fl. Ind. **3** (1832) 289; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 203; Prain ex King in Journ. As. Soc. Beng. **66** [2] (1897) 49; F.-Vill. Nov. App. (1880) 65.

Vigna luteola Merr. in Philip. Journ. Sci. **3** (1908) Bot. 411, non Benth.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4064 Fénix.* LUZON, Province of Cagayan, *For. Bur. 16778 Curran:* District of Bontoc, *For. Bur. 16550 Curran & Merritt:* Province of Benguet, *Williams 1287:* Province of Pangasinan, *Bur. Sci. 4875 Ramos:* Province of Pampanga, *Bolster 16, 59:* Province of Laguna, *Williams 2049, Elmer:* Province of Rizal, *For. Bur. 2167 Ahern's collector:* Province of Tayabas, *Bur. Sci. 9338 Robinson, Whitford 860.* TICAO, *For. Bur. 1048 Clark.* PALAWAN, *Merrill 808.* POLILLO, *Bur. Sci. 10764 McGregor.*

India to Malaya.

I am not at all sure that all the specimens cited above really represent *Phaseolus calcaratus* Roxb., but the description applies rather closely. Some of the specimens have been identified and distributed as *P. mungo* Linn., and others as *Vigna luteola* Baker. A good series of Indo-Malayan specimens is needed for purposes of comparison. The oldest valid specific name may prove to be *Phaseolus pubescens* Blume.

6. **Phaseolus radiatus** Linn. Sp. Pl. (1753) 725.

Phaseolus mungo Blanco Fl. Filip. (1837) 573, ed. 2 (1845) 400, ed. 3, **2**: 370; F.-Vill. Nov. App. (1880) 65; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 203 (in part), non Linn.

Luzon, Province of Batangas, *For. Bur. 7782 Curran & Merritt:* Province of Rizal, *Bur. Sci. 2169 Ramos.*

Native names: *Mungos* (widely used), *balatong,* ex Blanco.

The form here referred to *Phaseolus radiatus* Linn. is only cultivated in the Philippines, and is quite universally known as *mungos.* This erect form is the one described by Linnæus as *Phaseolus radiatus,* and is frequently identified as *Phaseolus mungo* Linn. I have seen no Philippine material that I consider referable to the true *Phaseolus mungo* Linn.

India to China and Malaya; widely cultivated and variable.

7. **Phaseolus sublobatus** Roxb. Hort. Beng. (1814) 54, Fl. Ind. **3** (1832) 288. *Phaseolus trinervius* Heyne in Wall. Cat. (1832) no. 5603; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 203: F.-Vill. Nov. App. (1880) 65.

Mindanao, Lake Lanao, *Mrs. Clemens 630.*

India to Malaya.

DOUBTFUL AND EXCLUDED SPECIES.

Phaseolus vulgaris Linn.; F.-Vill. Nov. App. (1880) 64. A number of forms of this are cultivated by Chinese gardeners for the Manila market, probably entirely grown from imported seeds.

Phaseolus ricciardianus Ten.; Usteri Beitr. Ken. Philip. Veg. (1905) 116, reported from Negros by Usteri, but I have seen no Philippine material.

A full series of the various cultivated species of this genus, and comparison of the same with extra-Philippine material is essential to a clear exposition of them.

87. VIGNA Savi.

Keel not prolonged into a beak; flowers yellow or yellowish.

Pods very long, up to 60 cm in length, many-seeded; cultivated.... 1. *V. sinensis*

Pods short, few-seeded, less than 7 cm in length.

Whole plant glabrous ..... 2. *V. lutea*

Young stems and pods pubescent, other parts of the plant often so. 3. *V. luteola*

Keel prolonged into a beak; pods densely pilose; flowers purplish.... 4. *V. pilosa*

1. **Vigna sinensis** (Linn.) Endl. ex Hassk. Pl. Jav. Rar. (1848) 386; Walp. Ann. **4**:562; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1887) 193.

Dolichos sinensis Linn. Cent. Pl. (1756) 28, Amoen. Acad. 4 (1859) 132.

Dolichos catiang Linn. Mant. (1771) 269.

Vigna catjang Walp. in Linnaea **13** (1839) 533; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 205; F.-Vill. Nov. App. (1880) 65; Naves in Blanco Fl. Filip. ed. 3, *pl. 285.*

Dolichos sesquipedalis Blanco Fl. Filip. (1837) 575, ed. 2 (1845) 401, ed. 3, **2**:375; Naves l. c. ed. 3, *pl. 286,* non Linn.

Phaseolus caracalla Blanco l. cc.; F.-Vill. Nov. App. (1880) 65, (?) non Linn.

Luzon, Manila, *Merrill 4104:* Province of Pampanga, *Merrill s. n.*

Quite universally known in the Philippines as *sitao; quibal,* ex Blanco. Cultivated only; cultivated in most tropical and subtropical countries.

2. **Vigna lutea** (Sw.) A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 452; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 205; Perk. Frag. Fl. Philip. (1904) 89; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 67.

Dolichos luteus Sw. Prodr. Veg. Ind. Occ. (1788) 105; DC. Prodr. **2** (1825) 398.

Vigna retusa Walp. Repert. **1** (1842) 778; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 51.

LUZON, Province of Bataan, *For. Bur. 2295 Meyer, Williams 316:* Province of Tayabas, *For. Bur. 9582 Curran, Whitford 687, Gregory 85.* POLILLO, *Bur. Sci. 9284 Robinson.* MINDORO, *Merrill 1263, 3334.* PALAWAN, *Bur. Sci. 336 Bermejos.* BALABAC, *Bur. Sci. 476 Mangubat.* MINDANAO, District of Cotabato, *Mrs. Clemens 814:* District of Zamboanga, *Hallier s. n.:* District of Davao, *Copeland 561.*

A species characteristic of sandy seashores, widely distributed in the Philippines; Tropics of the world.

O. Kuntze[63] reduces *Vigna luteola* Benth. and *V. lutea* A. Gray (*Dolichos luteus* Sw.) to *Vigna repens* (Linn.) O. Kuntze (*Dolichos repens* Linn.). Whether or not the reductions are correct I am unable to determine, but the specific name *repens* is invalidated in *Vigna* by *V. repens* Baker (1876).

3. **Vigna luteola** (Jacq.) Benth. in Thw. Enum. (1859) 90, and in Mart. Fl. Bras. **15** (1859–62) 194, *t. 50, fig. 2;* Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 205; Perk. Frag. Fl. Philip. (1904) 89.

Dolichos luteolus Jacq. Hort. Vind. **1** (1770) 39, *t. 90.*

MINDANAO, Lake Lanao, *Mrs. Clemens 209:* District of Cotabato, *For. Bur. 3951 Hutchinson.*

Tropics of the world; Baker, certainly by error, describes the pods as one-half inch wide.

4. **Vigna pilosa** (Roxb.) Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 207; Perk. Frag. Fl. Philip. (1904) 89; Usteri Beitr. Ken. Philip. Veg. (1905) 116; Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 22.

Dolichos pilosus Roxb. Hort. Beng. (1814) 55, Fl. Ind. **2** (1832) 312; DC. Prodr. **2** (1825) 397.

LUZON, Province of Rizal, *Merrill 3674:* Manila, *Hallier s. n.:* Province of Zambales, *Hallier s. n.*

India and Formosa.

DOUBTFUL AND EXCLUDED SPECIES.

VIGNA REPENS (Grah.) Baker; F.-Vill. Nov. App. (1880) 65. A species definitely known only from Burma, to which F.-Villar reduced *Dolichos repens* Blanco (non Linn.). I am unable to determine Blanco's species with satisfaction at the present time, although F.-Villar may have been correct in the reduction.

VIGNA VEXILLATA Rich.; Perk. Frag. Fl. Philip. (1904) 89. Credited to Mindanao on material collected by Warburg; I have seen no Philippine specimens that I consider referable to the species, and was unable to find Warburg's specimen in the Berlin herbarium.

88. DOLICHOS Linn.

Style flattened, bearded along the inner edge; inflorescence of axillary, elongated, narrow, racemose panicles; flowers various, purplish, pink, white, or slightly yellowish; pods flattened, about 2 cm wide ..... 1. *D. lablab*

Style filiform, not bearded on the inner edge, but usually so at the apex; flowers few, in short axillary racemes; pods less than 1 cm wide.

Glabrous or only slightly pubescent; leaflets lobed or repand; flowers pink. 2. *D. falcatus*

Softly pilose with long, spreading, white hairs; leaflets entire; flowers yellow. 3. *D. uniflorus*

1. **Dolichos lablab** Linn. Sp. Pl. (1753) 725; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 209; F.-Vill. Nov. App. (1880) 65; Perk. Frag. Fl. Philip. (1904) 90.

Lablab vulgaris Savi Diss. (1821) 19; DC. Prodr. **2** (1825) 401.

[63] Rev. Gen. Pl. (1891) 212.

Glycine lucida Blanco Fl. Filip. (1837) 578, non Forst.

Lablab cultratus DC. Prodr. **2** (1825) 402; Blanco Fl. Filip. ed. 2 (1845) 405, ed. 3, **2:** 379; Naves l. c. ed. *3, pl. 292.*

LUZON, Province of Cagayan, *For. Bur. 16763 Curran:* Province of Ilocos Norte. *Bur. Sci. 2206 Mearns:* Province of Union, *Elmer 5569, 5590, 5730:* District of Bontoc, *Bur. Sci. 7009 Ramos:* Province of Benguet, *Merrill 4314, For. Bur. 15740 Curran & Merritt:* Province of Batangas, *Cuzner 42:* Province of Laguna, *Hallier s. n.:* Manila, *Merrill 3448, 4089.* CULION, *Merrill 522.* BASILAN, *DeVore & Hoover 32.*

Widely distributed in the Philippines, cultivated and spontaneous; Tropics of the Old World.

Native names: *Batao* (widely used); *parda* (Ilocos); *sibachi* (Batangas); *baglao* (Basilan); *bulai,* ex Blanco.

Both the typical form, and the var. *lignosa* (Linn.) Prain, are represented in the material cited above, the former having seeds with their long axes parallel with the pod, and the later having seeds with their long axes across the pod.

The genus *Lablab* Adans. was based on the above species, and has been retained by some authors, including Pilger in Engl. & Prantl. Nat. Pflanzenfam. Nachtr. **3** (1908) 174, as worthy of generic rank.

2. **Dolichos falcatus** Klein in Willd. Sp. Pl. **3** (1800) 1047; DC. Prodr. **2** (1825) 398; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 453; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 211; F.-Vill. Nov. App. (1880) 66.

Dolichos trilobus Blanco Fl. Filip. ed. 2 (1845) 403, ed. 3, **2:** 375, non Linn.

LUZON, Province of Ilocos Norte, *For. Bur. 14678 Darling, Bur. Sci. 7678 Ramos:* Province of Batangas, *Cuzner 24:* Province of Laguna, *Bur. Sci. 6027 Robinson, Hallier s. n.:* Province of Rizal, *Baja 246.* CEBU, *Brown 6.* NEGROS, *For. Bur. 13714 Curran.*

Native names: *Paiap-gobat* (Laguna); *gocot-maya* (Cebu).

India and Ceylon, not reported from southern China or Malaya.

Dolichos trilobus Blanco was reduced by F.-Villar to *Phaseolus calcaratus* Roxb.; it is, however, unquestionably referable to *Dolichos falcatus* Klein.

3. **Dolichos uniflorus** Lam. Encycl. **2** (1786) 299; DC. Prodr. **2** (1825) 498; Trimen Fl. Ceyl. **2** (1894) 76.

LUZON, Province of Rizal, *Cuzner 29.*

India and Ceylon (var. *glaber* Trimen); other range uncertain on account of confusion with *Dolichos biflorus* Linn., to which Lamarck's species has been reduced by Baker, the range of the latter being given as "everywhere in the Tropics of the Old World." Not previously reported from the Philippines.

89. PACHYRRHIZUS Rich.

1. **Pachyrrhizus erosus** (Linn.) Urb. Symb. Antill. **4** (1905) 311.

Dolichos erosus Linn. Sp. Pl. (1753) 726.

Dolichos bulbosus Linn. l. c. ed. 2 (1763) 1021.

Pachyrrhizus angulatus Rich. ex DC. Prodr. **2** (1825) 402; Blanco Fl. Filip. ed. 2 (1845) 405, ed. 3, **2:**380; Miq. Fl. Ind. Bat. **1**[1] (1855) 191; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 207; F.-Vill. Nov. App. (1880) 65; Vid. Rev. Pl. Vasc. Filip. (1886) 110; Naves in Blanco Fl. Filip. ed. 3, *pl. 249;* Oliver in Hook. Ic. Pl. III **9** (1889) *pl. 1842*

Pachyrrhizus jicamas Blanco Fl. Filip. (1837) 579.

Pachyrrhizus bulbosus Kurz in Journ. As. Soc. Beng. **45**[2] (1876) 246; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 67.

Cacara erosa O. Kuntze Rev. Gen. Pl. (1891) 165.

LUZON, Province of Bataan, *For. Bur. 1955 Borden, Merrill 3098, For. Bur. 54 Barnes, Bur. Sci. 1611 Foxworthy:* Province of Rizal, *For. Bur. 3324 Ahern's collector:* Manila, *McGregor 65.* PANAY, *Yoder 31.*

Almost universally known in the Philippines as *sincamas,* ex Blanco also *hicamas.*

A species now widely distributed in the Tropics of the world, probably of American origin; thoroughly naturalized in the Philippines and very abundant.

The oldest generic name is *Cacara* (Rumph.) Thou. (1805), but *Pachyrrhizus* Rich. (1825) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

90. **PSOPHOCARPUS** Neck.

1. **Psophocarpus tetragonolobus** (Linn.) DC. Prodr. 2 (1825) 403; Miq. Fl. Ind. Bat. 1[1] (1855) 181; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 211; F.-Vill. Nov. App. (1880) 66; Perk. Frag. Fl. Philip. (1904) 90.

Dolichos tetragonolobus Linn. Sp. Pl. ed. 2 (1763) 1020; Blanco Fl. Filip. (1837) 576, ed. 2 (1845) 402, ed. 3, 2:374; Naves l. c. ed. 3, *pl. 293.*

Botor tetragonoloba O. Kuntze Rev. Gen. Pl. (1891) 162.

LUZON, Province of Cagayan, *Bolster 183, For. Bur. 16605, 16759 Curran:* Province of Pangasinan, *Bur. Sci. 4860, 4864 Ramos:* Province of Bataan, *Merrill 3313:* Manila, *Merrill 646, McGregor 47, 50.* MASBATE, *Merrill 3401.* PALAWAN, *For. Bur. 3614 Curran.* NEGROS, *For. Bur. 13659 Curran.*

Native names: *Cigarrillos* (widely used); *segadella* (Negros); *amale* (Cagayan); *calamismis, pal-lam,* ex Blanco.

Widely distributed in the Philippines, cultivated and naturalized; probably introduced. India to Malaya, etc., frequently cultivated.

PSOPHOCARPUS PALUSTRIS Desv. has been reported from the Philippines by F.-Villar (Nov. App. 66), but I have seen no specimens.

The generic name *Psophocarpus* Neck. (1790), is retained instead of *Botor* Adans. (1763), in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

EXCLUDED GENERA.

In the "Novissima Appendix" to the third edition of Blanco's "Flora de Filipinas," F.-Villar enumerates the following six species, representing six different genera. I have seen no Philippine representatives of any of these genera, and they are accordingly here excluded.

ACROCARPUS FRAXINIFOLIUS Wight; F.-Vill. Nov. App. (1880) 74. Known from India and Sumatra.

CICER ARIETINUM L.; F.-Vill. Nov. App. (1880) 62. Said by F.-Villar to be cultivated in Luzon and Panay. If the species occurs in the Philippines at all, then it will be only as an introduced plant.

DIALIUM LAURINUM Baker; F.-Vill. Nov. App. (1882) 351. A species of the Malay Peninsula.

MECOPUS NIDULANS Benn.; F.-Vill. Nov. App. (1880) 61. Burma to Malaya.

NEPTUNIA OLERACEA Lour.; F.-Vill. Nov. App. (1880) 73. Cosmopolitan in the Tropics. The specimen cited, *Cuming 2352,* was from Malacca, not from the Philippines.

PAROCHETUS COMMUNIS Ham.; F.-Vill. Nov. App. (1880) 58. India to southern China and Java.

CONTRIBUTIONS TO THE BRYOLOGICAL FLORA OF THE PHILIPPINES, III.[1]

By V. F. Brotherus.

(*Helsingfors, Finland.*)

SPHAGNACEÆ.

SPHAGNUM (Dill.) Ehrh.

Sphagnum Junghuhnianum Doz. & Molk.

Luzon, Province of Abra, Mount Panaga, *Bur. Sci. 7315 Ramos:* Province of Benguet, Pauai, *Bur. Sci. 3455, 4540 Mearns, Bur. Sci. 8678 McGregor,* altitude about 2,100 m; Mount Pulog, *For. Bur. 16421 Curran, Merritt, & Zschokke,* altitude about 2,700 m: Province of Zambales, Mount Pinatubo, *Bur. Sci. 2540 Foxworthy.*

DICRANACEÆ.

TREMATODON Michx.

Trematodon drepanellus Besch.

Luzon, Province of Benguet, Pauai, *Bur. Sci. 4548 Mearns,* altitude about 2,100 m; Mount Tonglon, *Bur. Sci. 5508 Ramos.* Mindoro, *For. Bur. 8814 Merritt.*

Area: Japan, Formosa.

Trematodon acutus C. Müll.

Luzon, Province of Laguna, Nagcarlan, *Copeland "m":* Province of Benguet, Pauai, *Bur. Sci. 8686 McGregor,* altitude about 2100 m: Province of Bataan, Mount Mariveles, *Copeland 1405.*

CERATODON Brid.

Ceratodon stenocarpus Bryol. eur.

Luzon, Province of Benguet, Mount Pulog, *For. Bur. 16408, 16422 Curran, Merritt, & Zschokke,* altitude above 2,500 m.

CAMPYLOPODIUM (C. Müll.) Besch.

Campylopodium euphorocladum (C. Müll.) Besch.

Batanes Islands, Batan, Mount Iraya, *Bur. Sci. 3858 Fénix.* Luzon, Province of Benguet, Pauai, *Merrill 6675:* Province of Nueva Viscaya, Mount Umugum, *Bur. Sci. 8278 Ramos.*

Area: Java, Tahiti, New Caledonia, and New Zealand.

[1] The geographic distribution is not indicated in the present paper for those species which were included in the first and second parts.

SYMBLEPHARIS Mont.

Symblepharis Reinwardtii (Doz. & Molk.) Bryol. jav.
Luzon, Province of Laguna, Mount Banajao, *Bur. Sci. 6604 Robinson.*
Area: Sikkim, Burma, Java, and Borneo.

BRAUNFELSIA Par.

Braunfelsia luzonensis Broth. sp. nov.

Dioica: robustiuscula, caespitosa, caespitibus densis, rigidis, lutescentibus, nitidis; *caulis* usque ad 4 cm altus, erectus vel procumbens, parce tomentosus, dense foliosus, dichotome ramosus; *folia* plus minusve patula, sicca erectiora, canaliculato-concava, superne tubuloso-concava, ovato-lanceolata, sensim subulato-acuminata, c. 5 mm longa, marginibus integerrimis, enervia, cellulis elongatis, valde incrassatis, inter se porosis, basilaribus luteis, alaribus sat numerosis, quadratis, fusco-aureis; *bracteae perichaetii* erectae, internae e basi longissime tubulosa sensim in subulam filiformem, thecam plus minusve longe superantem, subintegram vel minutissime denticulatam attenuatae, enerves; *seta* c. 12 mm alta, tenuis, lutescenti-rubra, flexuosula, laevissima; *theca* erecta, anguste cylindrica, 2.5–3 mm longa et c. 0.57 mm crassa, microstoma, fuscidula, aetate fusca, laevis; *peristomium* 0; *spori* 0.012–0.015 mm, laeves; *operculum* e basi conica longe et recte subulatum. Caetera ignota.

Luzon, Province of Zambales, Mount Tapulao, *For. Bur. 8172, 8178 Curran & Merritt, Bur. Sci. 5146 Ramos:* Province of Benguet, Mount Pulog, in the mossy forest, altitude about 2,600 m, *For. Bur. 16399 Curran, Merritt, & Zschokke:* Province of Abra, Mount Bawagan, *Bur. Sci. 7314 Ramos.*

Species distinctissima, habitu *B. scariosae* (Wils.) Par. similis, sed foliis enerviis facillime dignoscenda.

DICRANOLOMA Ren.

Dicranoloma Ramosii Broth. sp. nov.

Dioicum; robustulum, caespitosum, caespitibus densiusculis, pallide lutescenti-viridibus, nitidis; *caulis* fasciculo centrali praeditus, usque ad 5 cm altus, adscendens vel erectus, ubique ferrugineo- vel albido-tomentosus, dense foliosus, simplex vel furcatus; *folia* patula, comalia plerumque subsecunda, canaliculato-concava, breviter decurrentia, plicata, lanceolato-subulata, 5–7 mm longa, basi c. 0.65 mm lata, marginibus erectis, superne dense et argute serratis, angustissime vel indistincte limbata, nervo tenui, basi c. 0.05 mm lato, continuo, dorso superne argute serrato, cellulis elongatis, incrassatis, lumine angustissimo, basilaribus laxioribus, inter se valde porosis, alaribus numerosis, magnis, quadrato-hexagonis, fusco-aureis, omnibus laevissimis; *bracteae perichaetii* a basi late et longe vaginante subito in subulam serrulatam brevem vel longiorem productae; *sporogonia* plerumque aggregata, 2–4 ex eodem perichaetio; *seta* usque ad 1.5 cm alta, tenuis, flexuosula, lutescenti-rubra; *theca* erecta, cylindrica, 2–2.5 mm alta, leptodermis, fuscidula. Caetera ignota.

LUZON, Province of Benguet, Mount Ugo, *Bur. Sci. 5867 Ramos.*

Species *D. reflexo* (C. Müll.) et *D. reflexifolio* (C. Müll.) affinis, ab hac foliis comalibus subsecundis, cellulis basilaribus laxioribus, ab illa foliis minus argute serratis cellulisque magis incrassatis jam dignoscenda.

Dicranoloma Blumei (Nees) Ren.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8194, 8171 Curran & Merritt, Bur. Sci. 5147 Ramos:* Province of Laguna, Mount Banajao, altitude 600 m, *Bur. Sci. 6604 Robinson.*

Dicranoloma leucophyllum (Hamp.) var. **Kurzii** (Fleisch.)

D. brevisetum Broth. in Philip. Journ. Sci. **3** (1908) Bot. 12, nec *D. brevisetum* (Doz. & Molk.) Par.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4544 Mearns, Bur. Sci. 8694 McGregor*, altitude about 2,100 m; Suyoc to Pauai, *Merrill 4942*, on trees, altitude about 1970 m.

Area: Ceylon, Sumatra, Java, and Batjan.

LEUCOLOMA Brid.

Leucoloma (Syncratodictyon) perviride Broth. sp. nov.

Dioicum; gracile, caespitosum, caespitibus densiusculis, humilibus, late extensis, viridibus, basi fuscescentibus, haud nitidis; *caulis* usque ad 1 cm vel paulum ultra altus, adscendens, inferne radiculosus, dense foliosus, plus minusve ramosus; *folia* falcata, canaliculato-concava, e basi lanceolata vel oblongo-lanceolata sensim breviter subulata, c. 3 mm longa, marginibus erectis, apice minute serrulatis, limbata, limbo hyalino, basi latiusculo, superne sensim angustiore, in subula evanescente, nervo tenui, continuo, cellulis superioribus minutis, quadratis, chlorophyllosis, minutissime papillosis, basin versus sensim longioribus, basilaribus rectangularibus, laevibus, alaribus numerosis, magnis, oblongo-rectangularibus, curvatulis, fusco-aureis. Caetera ignota.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 6281.*

Species *L. amoene-virenti* Mitt. forsan proxima, sed statura graciliore, foliis viridibus, nitore destitutis, brevioribus, cellulis basilaribus brevioribus, minus incrassatis longe diversa.

BROTHERA C. Müll.

Brothera Leana (Sull.) C. Müll.

LUZON, Province of Benguet, Baguio, *For. Bur. 15636 ex p. Curran.*

Area: Himalaya, Japan, Manchuria, and northern America.

CAMPYLOPUS Brid.

Campylopus caudatus (C. Müll.) Mont.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4549 Mearns*, altitude about 2,100 m; Mount Tonglon (Santo Tomas), *For. Bur. 11068 Whitford:* Province of Abra, Mount Bawagan, *Bur. Sci. 7311 Ramos:* District of Lepanto, Mount Data, *For. Bur. 16018 Bacani.*

Campylopus (Trichophylli) Foxworthyi Broth. sp. nov.

Dioicus; gracilis, caespitosus, caespitibus densis, late extensis, fuscescenti-lutescentibus, nitidis; *caulis* ad 6 cm usque altus, erectus vel geniculato-adscendens, inferne fusco-tomentosus, dense foliosus, dichotome ramosus vel simplex, in planta fertili plerumque innovatione unica,

brevi praeditus; *folia* e basi erectiore patentia; canaliculato-concava, e basi oblongo-lanceolata, 0.7–0.75 mm lata raptim elongate et anguste subulata, pilo hyalino brevi vel longiore, stricto, serrulato terminata, marginibus erectis, integerrimis, nervo latissimo, basi dimidiam partem laminae vel paulum ultra, superne subulam totam occupante, dorso laevi, cellulis ventralibus inanibus, cellulis superioribus laminae rhomboideis, lumine anguste elliptico, basin versus sensim longioribus, basilaribus internis teneris, laxe oblongo-hexagonis, marginalibus angustis, limbum pluriseriatum, hyalinum efformantibus, alaribus parum numerosis, laxiusculis, fusco-aureis vel hyalinis, fugacibus; *flores foeminei* plures, terminales; *bracteae perichaetii* e basi alte et late vaginante, obtusa subito elongate subulata, piliferae; *sporogonia* 1–3; *seta* c. 5 mm alta, sicca flexuoso-erecta, humida cygnea, tenuis, fuscescenti-lutescens, laevis; *theca* erecta, minuta, ovalis, sicca plicatula, fuscidula, collo laevi; *exostomii* dentes paulum ultra medium divisi, dense striolati, rubri, apice hyalini; *operculum* alte conicum, obtusum. *Calyptra* ignota.

Luzon, Province of Zambales, Mount Pinatubo, *Bur. Sci. 2544, 2549, 2551, 2552 Foxworthy;* Mount Tapulao, *Bur. Sci. 5155 Ramos.*

Species e descriptione *C. hemitrichio* (C. Müll.) Jaeg. valde affinis, sed foliis omnibus piliferis bracteisque perichaetii internis convolutis, rotundato-obtusis, dein subito subulato-aristatis ut videtur diversa.

Campylopus (Trichophylli) diversinervis Broth. sp. nov.

Dioicus; gracilis, caespitosus, caespitibus densis, extensis, lutescenti-viridibus, inferne purpurascentibus, haud nitidis; *caulis* ad 6 cm usque altus, erectus, strictiusculus, inferne rubro-tomentosus, dense foliosus, plerumque simplex, in planta foeminea rarius innovatione unica, elongata praeditus; *folia* sicca erecta, humida erecto-patentia, canaliculato-concava, e basi oblonga sensim lanceolato-subulata, inferiora mutica, superiora pilo breviusculo, stricto, hyalino, serrulato terminata, marginibus erectis, superne incurvis, integerrimis, nervo latissimo, basi dimidiam partem vel paulum ultra laminae occupante, dorso humiliter lamellato, cellulis ventralibus inanibus, perminutis, cellulis laminalibus rhombeis, parum incrassatis, basilaribus hyalinis, interioribus laxe rectangularibus, pauciseriatis, externis multo angustioribus, limbum pluriseriatum, plus minusve alte productum, sensim angustiorem efformantibus, alaribus parum numerosis, teneris, laxis, fusco-aureis vel hyalinis. Caetera ignota.

Luzon, Province of Benguet, Mount Pulog, on earth in ravines, altitude 1,940 to 2,660 m, *For. Bur. 16407, 16423 Curran, Merritt, & Zschokke.*

Species cum *C. polytrichoide* De Not. comparanda, sed notis supra datis dignoscenda.

PILOPOGON Brid.

Pilopogon exasperatus (Brid.) Broth.

Luzon, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8703 McGregor.*

Area: Ceylon, Java, Celebes, Borneo, Hawaii.

Pilopogon subexasperatus (C. Müll.) Broth.

Luzon, Province of Benguet, *Bur. Sci. 3437 Mearns, For. Bur. 15948 Bacani;* Mount Pulog, open grass lands of the summit, altitude about 2,800 m, *For. Bur. 16428 Curran, Merritt, & Zschokke;* Pauai, altitude about 2,100 m, *Bur. Sci. 8684 McGregor:* Province of Abra, Mount Panaga, *Bur. Sci. 7317 Ramos:* Province of Zambales, Mount Pinatubo, *Bur. Sci. 2576 Foxworthy:* Province of Laguna, Mount Banajao, *For. Bur. 7995 Curran & Merritt.*

Area: Philippines.

Pilopogon Blumei (Doz. & Molk.) Broth.

Luzon, Province of Benguet, Mount Tonglon, *Bur. Sci. 5515, 5923 Ramos.*

FISSIDENTACEÆ.

FISSIDENS Hedw.

Fissidens anomalus Mont.

Luzon, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 4545 Mearns, Bur. Sci. 8682 McGregor.*

Fissidens (Serridium) pulogensis Broth. sp. nov.

Dioicus; robustus, caespitosus, caespitibus densiusculis, viridibus, aetate fuscescentibus, haud nitidis; *caulis* 2.5–3 cm altus, cum foliis c. 5 mm latus, basi fusco-radiculosus, laxiuscule foliosus, plerumque simplex; *folia* c. 15-juga, sicca incurva, humida strictiuscula, patentia, e basi caulis versus apicem sensim majora, asymmetrica, oblonga vel ovato-oblonga, obtusa, apiculata, ob cellulas prominentes minutissime serrulata, elimbata, lamina vera ad medium folii producta, lamina dorsali ad basin nervi enata ibidemque rotundata, nervo crassiusculo, flexuoso, in apiculum folii evanescente, cellulis minutis, c. 0.01 mm, rotundato-hexagonis, chlorophyllosis, laevibus, ad marginem folii minoribus, limbum parum distinctum efformantibus; *seta* terminalis, c. 4 mm alta, adscendens, rubra; *theca* erecta, oblonga, c. 2 mm longa, fuscescenti-rubra. Caetera ignota.

Luzon, Province of Benguet, Mount Pulog, on trees, mossy forest, above an altitude of 2,200 m, *For. Bur. 16396 Curran, Merritt, & Zschokke.*

Species pulcherrima, habitu *F. anomalo* Mont. simillima, sed *F. gymnogyno* Besch. affinis notisque supra datis distinctissima.

LEUCOBRYACEÆ.

LEUCOBRYUM Hamp.

Leucobryum sanctum Hamp.

Luzon, Province of Cagayan, *Bur. Sci. 7574, 7575, 7580 Ramos.* Negros, Cadiz, *Bur. Sci. 7351, 7354 Celestino.*

Leucobryum javense (Brid.) Mitt.

Luzon, Province of Zambales, Mount Tapulao, *For. Bur. 8169 Curran & Merritt.*

Leucobryum sericeum Broth.

Luzon, Province of Cagayan, Mount Cueva, *For. Bur. 16869 Curran.*

Area: Great Natunas and Borneo.

Leucobryum Boweringii Mitt.

BATANES ISLANDS, Batan, *Bur. Sci. 3855 Fénix.* LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8181 Curran & Merritt.*

Area: Himalaya, Ceylon, Sumatra, Java, Celebes, Hongkong, Formosa, and Japan.

OCTOBLEPHARUM Hedw.

Octoblepharum albidum (L.) Hedw.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.* LUZON, Province of Benguet, Baguio, *For. Bur. 15638 Curran.*

SCHISTOMITRIUM Doz. & Molk.

Schistomitrium apiculatum Doz. & Molk.

LUZON, Province of Zambales, Mount Tapulao, *Bur. Sci. 5152 Ramos.*

Schistomitrium Nieuwenhuisii Fleisch.

LUZON, Province of Abra, *Bur. Sci. 7310 Ramos.*

EXODICTYON Card.

Exodictyon Blumii (Nees, C. Müll.) Fleisch.

BATANES ISLANDS, Batan, *Bur. Sci. 3857 Fénix.*

Area: Java.

LEUCOPHANES Brid.

Leucophanes albescens C. Müll.

MINDANAO, Province of Surigao, Agusan Valley, *For. Bur. 7603 Hutchinson.*

Area: Java, Celebes, Philippines, and New Guinea.

SYRRHOPODONTACEÆ.

SYRRHOPODON Schwaegr.

Syrrhopodon (Orthotheca) Curranii Broth. sp. nov.

Dioicus; gracilis, caespitosus, caespitibus densiusculis, fuscescenti-viridibus, aetate fuscescentibus, haud nitidis; *caulis* erectus, vix ultra 5 mm altus, basi fusco-radiculosus, densiuscule foliosus, simplex; *folia* erecto-patentia, sicca circinato-incurva, humida strictiuscula, canaliculato-concava, e basi oblonga, paulum latiore sensim linearia, obtusa vel obtusiuscula, saepe mucronatula, usque ad 4 mm longa, marginibus partis basilaris superioris subciliato-serratis, partis laminalis lamellatis, geminatim serratis, nervo crassiusculo, infra summum apicem folii evanido, dorso papilloso, cellulis laminalibus minutissimis, subquadratis, chlorophyllosis, basilaribus laxis, hyalinis, breviter rectangularibus, marginalibus angustissimis, limbum hyalinum, pluriseriatum efformantibus; *seta* vix ultra 4 mm longa, tenuis, rubra; *theca* erecta, minuta, oblongo-cylindrica, fusco-rubra, nitidiuscula; *operculum* e basi conica aciculare; *calyptra* cucullata, maximam partem thecae obtegens.

LUZON, Province of Benguet, Baguio, *For. Bur. 15636 Curran.*

Species tenella, foliorum brevitate et structura faciliter dignoscenda.

POTTIACEÆ.

WEISIA Hedw.

Weisia flavipes Hook. f. & Wils.

LUZON, Province of Nueva Viscaya, Mount Umugum, *Bur. Sci. 8280 Ramos.*

Area: Eastern Australia, Tasmania, and New Zealand.

HYMENOSTYLIUM Brid.

Hymenostylium luzonense Broth. sp. nov.

Dioicum; gracile, caespitosum, caespitibus densis, extensis, laete- vel fuscescenti-viridibus, haud nitidis; *caulis* ad 5 cm usque altus, erectus vel adscendens, per totam longitudinem plus minusve fusco-radiculosus, laxiuscule foliosus, dichotome ramosus, ramis fastigiatis; *folia* sicca suberecta, flexuosula, humida subsquarroso-patula, carinato-concava, linearia, breviter lanceolato-acuminata, acutissima, marginibus plerumque basi uno latere anguste recurvis, caeterum erectis, integerrimis, nervo crassiusculo, infra summum apicem evanido, dorso laevi, cellulis minutis, incrassatis, quadratis vel rotundato-quadratis, chlorophyllosis, basilaribus rectangularibus, hyalinis, omnibus laevissimis; *seta* 5–7 mm alta, tenuis, strictiuscula, rubra, laevissima; *theca* erecta, oblonga, microstoma, fusco-rubra, haud nitida, laevis; *operculum* oblique rostratum, rostro theca breviore.

LUZON, Province of Benguet, Trinidad River, *Bur. Sci. 5518, 5519 Ramos:* Bued River, on dry cliffs, altitude about 920 m, *Merrill 4888.*

Species *H. curvirostro* (Ehrh.) Lindb. habitu similis, sed thecae forma oculo nudo jam dignoscenda.

MERCEYA Schimp.

Merceya subminuta Broth. sp. nov.

Autoica; tenella, caespitosa, caespitibus densis, late extensis, fuscescenti-viridibus, haud nitidis; *caulis* usque ad 1 cm altus, erectus, strictus, basi fusco-radiculosus, dense foliosus, simplex vel apice innovationibus brevibus, erectis praeditus; *folia* sicca incurvula, contracta, marginibus undulatis, humida erecto-patentia, carinato-concava, e basi breviter spathulata oblongo-lingulata, breviter acuminata, acuta, c. 2 mm longa et c. 0.53 mm lata, marginibus erectis, integerrimis, nervo crassiusculo, rufescente, infra summum apicem folii evanido, dorso laevi, cellulis plus minusve incrassatis, lumine angulato-rotundato, c. 0.007 mm, chlorophyllosis, basilaribus internis subito multo majoribus, laxis, quadratis, fusco-aureis, ad marginem infimam anguste rectangularibus, omnibus laevissimis; *bracteae perichaetii* foliis similes; *seta* c. 4 mm alta, tenuis, strictiuscula, sicca dextrorsum torta, lutea, laevissima; *theca* erecta, minuta, breviter oblonga, leptodermis, sicca deoperculata plicatula, nitidula, pallide fusca;

operculum oblique rostratum, rostro tenue, thecam aequante; *calyptra* cucullata, operculum tantum obtegens.

LUZON, Province of Benguet, Kabayan, *Merrill 4993*, on damp cliffs.

Species ob inflorescentiam autoicam a speciebus adhuc descriptis dignoscenda, sed speciei indescriptae, *M. minutae* Broth., e Himalaya valde affinis, unde nomen.

Merceya Bacanii Broth. sp. nov.

Dioica; gracilis, caespitosa, caespitibus mollibus, densis, late extensis, viridibus, haud nitidis; *caulis* 1.5 cm vel paulum ultra altus, erectus, strictiusculus, basi fusco-radiculosus, densiuscule foliosus, simplex; *folia* sicca contracta, difficiliter emollita, humida erecto-patentia, subcarinato-concava, apice planiuscula, spathulato-ligulata, rotundato-obtusa, c. 3 mm longa et c. 1 mm lata, marginibus basi anguste recurvis, dein erectis, integerrimis, nervo crassiusculo, superne multo tenuiore, infra summum apicem folii evanido, cellulis leptodermibus, subquadratis, 0.008–0.01 mm, chlorophyllosis, sublaevibus, marginem versus in seriebus pluribus multo minoribus, incrassatis, basilaribus laxis, rectangularibus, inanibus, hyalinis vel aureis, secus nervus alte productis, ibidemque sensim minoribus, marginalibus ad basin multo angustioribus. Caetera ignota.

LUZON, Province of Benguet, *For. Bur. 15942 Bacani*, on cliffs.

Species *M. ligulatae* (Spruce) Schimp. affinis, sed foliis latioribus cellulisque laxis secus nervum alte productis diversa.

ORTHOTRICHACEÆ.

ANOECTANGIUM (Hedw.) Bryol. eur.

Anoectangium euchloron (Schwaegr.) Mitt.

LUZON, Province of Benguet, Bugias, *For. Bur. 15985 Bacani.*

Area: Tropical America, Cameroon, and Java.

DESMOTHECA Lindb.

Desmotheca apiculata (Doz. & Molk.) Lindb.

LUZON, Province of Cagayan, *Bur. Sci. 7972 Ramos.*

Area: Sumatra, Java, Amboina, and the Philippines.

MACROMITRIUM Brid.

Macromitrium Reinwardtii Schwaegr.

LUZON, Province of Zambales, Mount Tapulao, *Bur. Sci. 5150 Ramos:* Province of Benguet, Mount Pulog, *For. Bur. 16431 Curran, Merritt, & Zschokke, Merrill 6398, 6400;* on trees, altitude about 2,570 m.

Macromitrium Blumei Nees.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8188 Curran & Merritt.*

Macromitrium semipellucidum Doz. & Molk.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

Area: Java, Borneo, New Guinea.

Macromitrium subuligerum Bryol. jav.

LUZON, Province of Bataan, Mount Mariveles, *Bur. Sci. 6213 Robinson.* MINDORO, Alag River, *Merrill 5688,* on branches of trees along the river, altitude about 90 m.

Macromitrium sulcatum (Hook. & Grev.) Brid.

LUZON, Province of Benguet, Mount Tonglon, *Bur. Sci. 5506 Ramos;* Mount Pulog, *For. Bur. 16424 Curran, Merritt, & Zschokke.*

Macromitrium (Leiostoma) goniostomum Broth. sp. nov.

Dioicum; robustum, caespitosum, caespitibus laxis, fuscescentibus, haud nitidis; *caulis* elongatus, repens, plus minusve fusco-radiculosus, plus minusve dense ramosus, ramis erectis, 2–3 cm longis, dense foliosis, simplicibus vel superne dichotome ramulosis, obtusis; *folia ramea* sicca flexuoso-adpressa, humida erecto-patentia, carinato-concava, e basi oblonga lanceolato-acuminata, acuta, marginibus erectis, integerrimis, rarius summo apice minutissime serrulatis, nervo continuo vel breviter excedente, cellulis subrotundis, c. 0.01 mm, haud incrassatis, papilla acuta ornatis, chlorophyllosis, marginalibus minoribus, basilaribus elongatis valde incrassatis, lumine angustissimo, ad plicas elevato-papillosis; *bracteae perichaetii* longe et anguste acuminatae; *seta* 1–1.5 cm alta, sicca dextrorsum torta, tenuis, rubra, laevissima; *theca* erecta, ovata, indistincte plicatula, nitidula, fusca, ore angustata, intensius colorata, distincte plicata; *peristomium ?; operculum* e basi conica aciculare; *calyptra* nuda, junior summo apice parce pilosa. Planta mascula ignota.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 8697 McGregor, Bur. Sci. 4551 Mearns,* altitude about 2,150 m; Mount Pulog, *Bur. Sci. 6401 Merrill.*

Species distinctissima, *M. sulcato* (Hook. & Grev.) Brid. habitu similis, sed foliorum cellulis multo majoribus thecaque ore angustata ibidemque distincte plicata facillime dignoscenda.

Macromitrium goniorhynchum (Doz. & Molk.) Mitt.

LUZON, Province of Benguet, *Bur. Sci. 2843a, 2852 Mearns.*

SCHLOTHEIMIA Brid.

Schlotheimia Wallisii C. Müll.

LUZON, Province of Benguet, Mount Ugo, *Bur. Sci. 5868 Ramos;* Mount Pulog, *For. Bur. 16397, 16414, 16415 Curran, Merritt, & Zschokke,* altitude 2518 to 2670 m, *Bur. Sci. 8907 McGregor:* Province of Zambales, Mount Tapulao, *Bur. Sci. 5141 Ramos, For. Bur. 8191, 8200 Curran & Merritt:* Province of Laguna, Mount Banajao, *Bur. Sci. 6600 Robinson.*

Area: Philippines.

FUNARIACEÆ.

FUNARIA Schreb.

Funaria luzonensis Broth.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4550, 4552 Mearns, Bur. Sci. 8698 McGregor,* altitude about 2,100 m.

Funaria calvescens Schwaegr.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 8704 McGregor;* Mount Pulog, *Bur. Sci. 8911 McGregor;* Mount Tonglon, *Bur. Sci. 5509 Ramos;* Mount Ugo, *Bur. Sci. 5870 Ramos;* Trinidad River, *Bur. Sci. 5517 Ramos:* Province of Abra, *Bur. Sci. 7309 Ramos.* MINDORO, *For. Bur. 11035 Merritt.*

BRYACEÆ.

BRACHYMENIUM Schwaegr.

Brachymenium nepalense Hook.

LUZON, Province of Benguet, Bugias, *For. Bur. 15090 Bacani;* Mount Pulog, *For. Bur. 16432 Curran, Merritt, & Zschokke.*

Brachymenium exile (Doz. & Molk.) Bryol. jav.

LUZON, Province of Benguet, *Bur. Sci. 5866a Ramos.*

Area: Himalaya, Nilghiri, Ceylon, Sumatra, Java, and Formosa.

POHLIA Hedw.

Pohlia scabridens (Mitt.) Broth.

LUZON, Province of Benguet, Mount Tonglon, *Bur. Sci. 5507 Ramos.*

Area: Japan and Formosa.

Pohlia elongata (Hedw.)

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4554 Mearns,* altitude about 2,100 m.

Area: Europe, Algeria, Kilamandjaro, Kerguelen, Caucasas, Himalaya, Yunnan, Amur, Japan, and North America.

Pohlia leptocarpa (Bryol. jav.) Fleisch.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 8685, 8700 McGregor,* altitude about 2,100 m.

Area: Java and Borneo.

ANOMOBRYUM Schimp.

Anomobryum gemmigerum Broth. sp. nov.

Dioicum; robustiusculum, caespitosum, caespitibus laxiusculis, mollibus, pallide viridibus, nitidis; *caulis* usque ad 3.5 cm longus, erectus, flexuosulus, infima basi fusco-radiculosus, densiuscule foliosus, simplex, in axillis foliorum saepe gemmula numerosa, obovata, microphyllina gerens; *folia* imbricata, cochleariformi-concava, oblongo-lanceolata, acuta, marginibus erectis, summo apice minutissime serrulatis, nervo tenui continuo vel subcontinuo, cellulis teneris, elongate rhomboideo-hexagonis (c. 1×10), basilaribus laxioribus et brevioribus. Caetera ignota.

LUZON, Province of Benguet, Bugias, *For. Bur. 15986 Bacani.*

Species foliorum forma et structura gemmulisque microphyllinis distinctissima.

Anomobryum uncinifolium Broth. sp. nov.

Dioicum; gracillimum, aliis muscis immixtum, rigidum, lutescenti-viride, haud nitidum; *caulis* c. 1 cm altus, erectus, flexuosus, basi fusco-radiculosus, dense foliosus, simplex vel apice innovationibus binis, erectis, 3–4 mm longis praeditus; *folia* arcte imbricata, apice unum latus versus spectantia ideoque ibidem uncinatula, late ovata, obtusiuscula, marginibus erectis, superne crenulatis, nervo crasso, infra apicem folii evanido, cellulis rhombeis, valde incrassatis, lumine ovali, basilaribus breviter rectangularibus vel subquadratis, haud incrassatis; *bracteae perichaetii*

intimae e basi alte et late vaginante subito in subulam brevem, integram, obtusiusculam contracta, nervo tenuiore. Caetera ignota.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16417 ex p. Curran, Merritt, & Zschokke,* in the open pine region, altitude about 1,900 m.

Species curiosissima, forsan typus novi generis.

Anomobryum cymbifolium (Lindb.) Broth.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4542 Mearns,* altitude about 2,100 m.

Area: Himalaya, Khasia, Coorg, Java, Amboina, and the Philippines.

BRYUM Dill., Schimp.

Bryum (Areodictyon) diversifolium Broth. sp. nov.

Dioicum; caespitosum, caespitibus densis, mollibus, pallide lutescenti-viridibus, nitidis; *caulis* vix ultra 1 cm altus, erectus, fusco-tomentosus, dense foliosus, superne innovationibus c. 5 mm longis, erectis dense et aequaliter foliosis, obtusis; *folia caulina* sicca suberecta, humida erecto-patentia, concava, elongate oblonga vel elliptico-oblonga, acuta vel raptim apiculata, marginibus erectis, integris vel subintegris, nervo tenuissimo, rubro, infra summum apicem folii evanido vel brevissime excedente, cellulis teneris, elongate hexagonis, inanibus, basilaribus majoribus, marginalibus angustissimis, limbum uniseriatum efformantibus; *innovationum* erectiora, minora, obtusa vel apiculata; *bracteae perichaetii* foliis similes; *seta* c. 2 cm alta, tenuissima, flexuosula, rubra; *theca* inclinatula, asymmętrica, collo corrugato, sporangio oblongo subaequante, sicca sub ore haud constricta, leptodermis, pallide fusca, aetate fusca, nitidula. Caetera ignota.

LUZON, District of Bontoc, near Bontoc, *For. Bur. 16556 Curran & Merritt.*

Species *B. compressidenti* C. Müll. affinis, sed foliorum forma longe diversa.

Bryum argenteum L.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4433 Mearns;* Trinidad River, *Bur. Sci. 5517 ex p. Ramos.*

Bryum erectum Broth.

LUZON, Province of Benguet, Kabayan, *For. Bur. 15988 Bacani:* District of Bontoc, *Bur. Sci. 7012 Ramos.*

Bryum coronatum Schwaegr.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9109 Whitford & Hutchinson.*

Bryum ambiguum Dub.

MINDORO, *For. Bur. 12140 Merritt.* LUZON, Province of Bataan, Lamao, *For. Bur. 7519 Curran.*

Bryum (Trichophora) rubrolimbatum Broth. sp. nov.

Dioicum; caespitosum, caespitibus laxiusculis, mollibus, pallide viridibus, haud nitidis; *caulis* vix ultra 1 cm altus, erectus, inferne fusco-tomentosus, dense foliosus, innovationibus brevibus; *folia* sicca contracta, plus minusve distincte spiraliter contorta, humida patula, planiuscula

vel carinato-concava, spathulato-obovata, breviter acuminata, acuta, aristata, c. 3 mm longa et c. 1.3 mm lata, marginibus e basi ultra medium plus minusve distincte revolutis, superne minute serrulatis, limbata, nervo basi crassiusculo, dein multo tenuiore, in aristam brevem strictiusculam, rubram excedente vel infra summum apicem folii evanido, cellulis laxis, oblongo-hexagonis, chlorophyllosis, basilaribus elongate rectangularibus, marginalibus elongatis, angustis, limbum biseriatum, rubrum efformantibus; *bracteae perichaetii* minores et angustiores, longius aristatae; *seta* 2–4 cm alta, flexuosula, tenuis, rubra; *theca* subhorizontalis, clavato-pyriformis, c. 4 mm longa et c. 1 mm crassa, sicca deoperculata sub ore haud constricta, fuscescenti-rubra, haud nitida; *exostomii* dentes rufescentes, lineari-lanceolata, hyalino-limbata, densissime striolata, apice hyalina, papillosa, dense lamellata; *endostomium* sordide luteum, papillosum; *corona basilaris* ultra medium dentium producta; *processus* late lanceolati, late perforati; *cilia* terna, longe appendiculata; *spori* c. 0.007 mm, papillosi; *operculum* convexum, obtuse apiculatum.

Luzon, Province of Benguet, Pauai, *Bur. Sci. 8702 McGregor*, altitude about 2,100 m, on earth.

Species ex affinitate *B. capillaris* L., sed foliis rubrolimbatis jam dignoscenda.

Bryum ramosum (Hook.) Mitt.

Luzon, Province of Benguet, Mount Pulog, *For. Bur. 16398 Curran, Merritt, & Zschokke.*

Area: Nepal, Nilghiri, Coorg, Ceylon, Java, and Formosa.

RHODOBRYUM (Schimp.) Hamp.

Rhodobryum Curranii Broth. sp. nov.

Dioicum; robustum, caespitosum, caespitibus densiusculis, saturate viridibus, inferne fuscescentibus, haud nitidis; *caulis* 2–3 cm altus, erectus, flexuosus, inferne fusco-tomentosus, superne dense et subaequaliter foliosus, simplex; *folia* sicca contracta, humida erecto-patentia, carinato-concava vel planiuscula, e basi brevissime spathulata ovalia, breviter aristata, marginibus erectis vel infima basi angustissime recurvis, e medio ad apicem argute serrata, nervo crassiusculo, superne multo teuniore, in aristam brevem excedente, cellulis stereideis nullis praedito, cellulis ovali-hexagonis, superioribus c. 0.05 mm longis et 0.02–0.025 mm latis, chlorophyllosis, marginalibus longioribus et angustioribus limbum 1–2 seriatum efformantibus, basilaribus breviter rectangularibus. Caetera ignota.

Luzon, Province of Benguet, *For. Bur. 15635 Curran.*

Species *R. olivaceo* (Hamp.) Broth. affinis, sed foliorum forma limboque angustissimo dignoscenda.

Rhodobryum giganteum (Hook.) Schimp.

Luzon, Province of Laguna, Mount San Cristobal, *Copeland:* Province of Benguet, Pauai, *Bur. Sci. 8677 McGregor*, altitude about 2,100 m.

Area: Nepal, Sikkim, Khasia, Ceylon, Sumatra, Java, Borneo, China, Japan, Hawaii, and Bourbon.

MNIACEÆ.

MNIUM (Dill.) Linn.

Mnium rostratum Schrad.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16394, 16402 Curran, Merritt, & Zschokke,* altitude about 2,660 m: District of Lepanto, Mount Data, *Bur. Sci. 5965 Ramos.*

RHIZOGONIACEÆ.

HYMENODON Hook. f. & Wils.

Hymenodon sericeus (Doz. & Molk.) C. Müll.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16404 Curran, Merritt, & Zschokke.*

Area: Java and Borneo.

RHIZOGONIUM Brid.

Rhizogonium spiniforme (L.) Bruch.

LUZON, Province of Abra, *Bur. Sci. 7308 Ramos:* Province of Zambales, Mount Tapulao, *Bur. Sci. 5143 Ramos, For. Bur. 8160 Curran & Merritt:* Province of Bataan, Mount Mariveles, *For. Bur. 7518 Curran, Merrill 6280:* Province of Camarines, Maagnas, *Bur. Sci. 6367 Robinson:* Province of Tayabas, Mount Banajao, *For. Bur. 7997 Curran & Merritt;* Mount Malaraya, *For. Bur. 7775 Curran & Merritt:* Province of Benguet, Pauai, *Bur. Sci. 8683 McGregor,* altitude about 2,100 m. MINDORO, *For. Bur. 9978 Merritt.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

BARTRAMIACEÆ.

LEIOMELA (Mitt.) Broth.

Leiomela javanica (Ren. & Card.) Broth.

LUZON, Province of Benguet, Mount Pulog, *Bur. Sci. 8909 McGregor.*

Area: Java.

PHILONOTIS Brid.

Philonotis Wallisii (C. Müll.) Jaeg.

LUZON, Province of Rizal, *For. Bur. 10041 bis Curran.*

Area: Philippines.

Philonotis falcata (Hook.) Mitt.

LUZON, Province of Benguet, Bugias, *For. Bur. 15984 Bacani, Bur. Sci. 5927 Ramos.*

BREUTELIA Schimp.

Breutelia Merrillii Broth.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16406 Curran, Merritt, & Zschokke.*

Breutelia arundinifolia (Dub.) Broth.

LUZON, Province of Laguna, Mount Banajao, *Copeland s. n.*

POLYTRICHACEÆ.

PSEUDORACELOPUS Broth. gen. nov.

Pseudoracelopus philippinensis Broth. sp. nov.

Dioicus; gracilis, gregarie crescens, sordide viridis, haud nitidus; *caulis* fasciculo centrali majusculo praeditus, usque ad 1 cm vel paulum ultra altus, erectus, basi fusco-radiculosus, densiuscule foliosus, simplex; *folia* infima minuta, superiora multo majora, sicca incurva, humida erecto-patentia, canaliculato-concava, e basi brevi, vix latiore oblonga vel oblongo-ligulata, obtusiuscula vel obtusa, unistratosa, marginibus in parte superiore laminae obtuse serrulatis, lamellis nullis, nervo crassiusculo, infra summum apicem folii evanido, dorso laevi, fasciculo dorsali et ventrali stereidearum bene evoluto, cellulis laminalibus laxiusculis, collenchymatice incrassatis, superioribus lumine subrotundo vel irregulariter angulato, c. 0.025 mm, chlorophyllosis, basilaribus teneris, rectangularibus, parce chlorophyllosis; *seta* terminalis, 1.5–2 cm alta, flexuosula, fuscescenti-lutea, ubique papillosa, sicca apice dextrorsum torta; *theca* erecta vel inclinatula, paulum asymmetrica, breviter oblonga vel obovato-oblonga, brevicollis, sicca macrostoma, sub ore constricta, laevis; *stomata* nulla; *exostomii* dentes in membrana humili lineares obtusi, c. 0.15 mm longi, rufescentes, anguste hyalino-limbati; *spori* 0.005 mm, lutescenti-virides, laevissimi; *operculum* convexum, late et obtuse mammillatum; *calyptra* albida, pilosa, thecam totam obtegens. *Plantula mascula* ignota.

Luzon, Province of Cagayan, on earth, *Bur. Sci. 7572, 7576 Ramos.*

Genus insigne, inter *Racelopus* Doz. & Molk. et *Pogonatum* Brid. ponendum, ab hoc foliis lamellis omnino destitutis setaque papillosa, ab illo foliorum structura dignoscendum.

POGONATUM Palis.

Pogonatum albo-marginatum (C. Müll.) Jaeg.

Luzon, Province of Benguet, *Bur. Sci. 2849 Mearns, For. Bur. 15637 Curran;* Mount Ugo, *Bur. Sci. 5513, 5871 Ramos:* Baguio, *Bur. Sci. 8304 McGregor, Copeland;* Mount Pulog, *For. Bur. 16409 Curran, Merritt, & Zschokke,* pine slopes, altitude 1730 to 2,000 m; Pauai, *Bur. Sci. 8687, 8693, 8696 McGregor:* Province of Nueva Viscaya, *Bur. Sci. 8279 Ramos:* Province of Zambales, Mount Tapulao, *For. Bur. 8201 Curran & Merritt:* Province of Abra, *Bur. Sci. 7316 Ramos.*

Pogonatum microstomum R. Br.

Luzon, Province of Benguet, Mount Pulog, *For. Bur. 16411 Curran, Merritt, & Zschokke,* grassy slopes, altitude about 1,900 m, *Bur. Sci. 8908 McGregor;* Pauai, *Bur. Sci. 8687 ex p. McGregor,* altitude about 2,100 m.

Pogonatum Warburgii C. Müll.

Luzon, Province of Zambales, Mount Tapulao, *For. Bur. 8176 Curran & Merritt:* District of Lepanto, Mount Data, *Bur. Sci. 5957 ex p. Ramos.*

Area: Philippines.

Pogonatum spurio-cirratum Broth. sp. nov.

Pogonatum cirratum Broth. in Philip. Journ. Sci. **3** (1908) Bot. 22, nec. *P. cirratum* (Sw.) Brid.

Dioicum; sat gracile, caespitosum, caespitibus laxis, rigidis, fuscescenti-viridibus, apice obscure viridibus, vix nitidiusculis; *caulis* usque ad 11 cm altus, erectus, infima basi fusco-radiculosus, laxe foliosus, plerumque simplex, raro apice furcatus; *folia* infima minuta, squamaeformia, dein sensim multo majora, sicca laxe circinato-incurva, marginibus involutis, humida canaliculato-concava, e basi semivaginante, breviter ovali, sensim lineari-lanceolata, acutiuscula, marginibus in parte vaginali integris, in lamina parte infima excepta dense serratis, lamina lamellis densis, ab uno strato (2–5) cellularum subaequalium constructis obtecta, nervo crasso, subexcurrente, superne dorso spinoso-serrato, cellulis laminalibus minutis, incrassatis, quadratis, c. 0.01 mm, vaginalibus teneris, elongate rectangularibus marginalibus multo brevioribus, subincrassatis, *seta* terminalis vel caulis innovatione pseudo-lateralis, 2.5–3.5 cm alta, flexuosula, rubra, nitidiuscula; *theca* erecta vel suberecta, oblongo-cylindrica, sicca macrostoma et infra orificium paulum contracta, haud plicata, fusco-viridis; *exostomii* dentes sicci incurvi c. 0.2 mm alti, hyalini, medio rufescentes; *spori* 0.005–0.007 mm, olivacei, laevissimi; *operculum* e basi convexa conico-acuminatum; *calyptra* pallida, pilosa, thecam totam obtegens. Planta mascula ignota.

Luzon, District of Lepanto, Mount Data, *Merrill 4908*, altitude about 2,120 m: Province of Benguet, Pauai, *Bur. Sci. 4557 Mearns, Bur. Sci. 8688 McGregor*, altitude about 2,100 m; Mount Tonglon, *Bur. Sci. 5505 Ramos;* Mount Pulog, *Bur. Sci. 6396 Merrill, For. Bur. 16393, 16412 Curran, Merritt, & Zschokke:* Province of Laguna, Mount Banajao, altitude 2,000 m, *Copeland, Bur. Sci. 6562 Robinson, For. Bur. 7992 Curran & Merritt.*

Species a me prius cum *P. cirrato* (Sw.) Brid. commutata, sed foliis in parte vaginali integris setaque breviore dignoscenda.

Pogonatum Wallisii (C. Müll.) Jaeg.

Luzon, Province of Benguet, Batan, *Bur. Sci. 5924 Ramos.*

Area: Philippines.

CRYPHAEACEÆ.

PILOTRICHOPSIS Besch.

Pilotrichopsis dentata (Mitt.) Besch.

Luzon, Province of Benguet, Mount Pulog, *Bur. Sci. 8906 McGregor.*

Area: Japan and Formosa.

SPIRIDENTACEÆ.

SPIRIDENS Nees.

Spiridens Reinwardtii Nees.

Luzon, Province of Benguet, Mount Tonglon, *Bur. Sci. 5516 Ramos:* Pauai, *Bur. Sci. 8679 McGregor, Bur. Sci. 4436 Mearns,* altitude about 2,100 m: District of Lepanto, Mount Data, *For. Bur. 16014 Bacani,* altitude about 2,100 m: Province of Cagayan, Caua Volcano, *Clark s. n.* Leyte, central divide, altitude about 1,150 m, *For. Bur. 16015 Rosenbluth.*

MYURIACEÆ.

MYURIUM Schimp.

Myurium Foxworthyi (Broth.) Broth. comb. nov.
Oedicladium Foxworthyi Broth. in Philip. Journ. Sci. **3** (1908) Bot. 23.
LUZON, Province of Laguna, Mount Banajao, *Bur. Sci. 6608 Robinson,* altitude 2,000 m.

NECKERACEÆ.

PTEROBRYELLA (C. Müll.) C. Müll.

Pterobryella longifrons (C. Müll.) C. Müll.
LUZON, Province of Laguna, Mount Banajao, *Copeland s. n., Bur. Sci. 6592 Robinson, For. Bur. 7985 Curran & Merritt.*

TRACHYLOMA Brid.

Trachyloma tahitense Besch.
LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16427 Curran, Merritt, & Zschokke.*
Area: Ceylon, Java, and Tahiti.

ENDOTRICHELLA C. Müll.

Endotrichella elegans (Doz. & Molk.) C. Müll.
BATANES ISLANDS, Batan, Mount Iraya, *Bur. Sci. 3862 Fénix.* LUZON, Province of Zambales, Mount Tapulao, *Bur. Sci. 5140 Ramos:* Province of Benguet, Mount Pulog, *Bur. Sci. 8905 McGregor.*

GAROVAGLIA Endl.

Garovaglia plicata (Nees) Endl.
MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*
Area: Sikkim, Sumatra, Java, and Ceram.

PTEROBRYOPSIS Fleisch.

Pterobryopsis (Pterobryodendron) Clemensiae Broth. sp. nov.

Dioica; robusta, lutescenti-viridis, nitidiuscula; *caulis* secundarius cum ramis c. 6 cm altus, stipitatus, stipite 1–2 cm alto, foliis squamaeformibus plerumque destructis obtecto, superne dendroideo-ramosus, ramis erecto-patentibus vel suberectis, usque ad 4 cm longis et 5–6 mm crassis, strictiusculis, dense et turgide foliosis, parce ramulosis, obtusis vel breviter flagelliformiter attenuatis ibidemque corpusculis numerosissimis, pluricellularibus praeditus; *folia* ramea erecto-patentia, cochleariformi-concava, oblonga, subito in subulam c. 0.6 mm longam, strictiusculam, angustam attenuata, marginibus superne conniventibus, integerrimis, enervia, cellulis anguste linearibus, basilaribus infimis laxioribus, inter se porosis, aureis, alaribus sat numerosis, subquadrato-hexagonis, fusco-aureis, omnibus laevissimis. Caetera ignota.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens "P."*
Species pulcherrima, a speciebus caeteris sectionis foliis enerviis dignoscenda.

SYMPHYSODON Fleisch.

Symphysodon subneckeroides Broth.
MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens "Q."*
Area: Negros.

METEORIUM Doz. & Molk., Fleisch.

Meteorium Miquelianum (C. Müll.) Fleisch.
LUZON, Province of Benguet, Mount Pulog, *Bur. Sci. 8910 McGregor.*
Area: Ceylon, Sumatra, Java, Celebes, Ternate, Halmaheira, Batjan, Sumbawa, Japan, and New Guinea.

Meteorium helminthocladum (C. Müll.) Fleisch.
LUZON, Province of Benguet, Mount Pulog, *Merrill 6397;* Pauai, altitude about 2,100 m, *Bur. Sci. 8691 McGregor, Merrill 6671.*
Area: China, Japan, and Formosa.

AËROBRYOPSIS Fleisch.

Aërobryopsis longissima (Doz. & Molk.) Fleisch.
LUZON, Province of Benguet, Pauai, *Merrill 6674,* altitude about 2,100 m.
Area; Malay Archipelago to New Guinea.
Var. **Dozyana** (C. Müll.) Fleisch.
LUZON, Province of Camarines, Maagnas, *Bur. Sci. 6337 Robinson.*
Area: Java.

FLORIBUNDARIA C. Müll.

Floribundaria floribunda (Doz. & Molk.) Fleisch.
LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16419 Curran, Merritt, & Zschokke.*
Area: Widely distributed in southern and eastern Asia, extending to New Guinea and Polynesia.

BARBELLA (C. Müll.) Fleisch.

Barbella pendula (Sull.) Fleisch.
LUZON, Province of Benguet, Pauai, *Merrill 6672.*
Area: Ceylon, Sumatra, Java, Formosa, China, Japan, and North America.

METEORIOPSIS Fleisch.

Meteoriopsis reclinata (C. Müll.) Fleisch.
LUZON, Province of Benguet, Mount Tonglon, *Bur. Sci. 5510 ex p. Ramos.*
Area: Sikkim, Nilghiri, Coorg, Java, Celebes, Formosa, and the Philippines.

CHRYSOCLADIUM Fleisch.

Chrysocladium rufifolioides Broth. sp. nov.

Dioicum; sat gracile, pendulum, fusco-aureum, haud nitidum; *caulis secundarius* usque ad 12 cm longus, dense subpinnatim ramosus, ramis elongatis, complanatis, dense foliosis, attenuatis, simplicibus vel irregulariter ramulosis; *folia ramea* disticha, patula, e basi breviter decurrente, cordato-ovata lanceolato-subulata, longe pilifera, marginibus basi uno latere inflexis, ubique argute serrulatis, nervo tenui, lutescente, ultra medium folii evanido, cellulis elongate rhomboideis, papillosis, basilaribus

elongatis, incrassatis, laevibus, alaribus paucis, quadratis, fusco-aureis. Caetera ignota.

LUZON, Province of Benguet, Mount Pulog, *Bur. Sci. 8914 McGregor.*

Species *C. rufifolio* (Mitt.) habitu valde similis, sed foliis distinctius papillosis, cellulisque basilaribus elongatis, incrassatis dignoscenda.

TRACHYPUS Reinw., Fleisch.

Trachypus subbicolor C. Müll.

LUZON, Province of Benguet, Pauai, *Merrill 6679:* District of Lepanto, Mount Data, *For. Bur. 16013 Bacani.*

TRACHYPODOPSIS Fleisch.

Trachypodopsis crispatula (Hook.) Fleisch.

LUZON, Province of Benguet, *Bur. Sci. 3386 Mearns;* Pauai, altitude about 2,100 m, *Bur. Sci. 8690 McGregor.*

Area: Sikkim, Bhotan, Nepal, Khasia, Yunnan, Ceylon, Andamans, and Halmaheira.

PSEUDOSPIRIDENTOPSIS (Broth.) Fleisch.

Pseudospiridentopsis horrida (Mitt.) Fleisch.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8195 Curran & Merritt.*

Area: Bhotan and Formosa.

CALYPTOTHECIUM Mitt.

Calyptothecium tumidum (Dicks.) Fleisch.

LUZON, Province of Benguet, Mount Tonglon, *Bur. Sci. 5510 Ramos.*

Area: Nepal, Madras, Coorg, Ceylon, Sumatra, Java, Celebes, Sumbawa, Ceram, Saparoea, New Guinea, and the Philippines.

Calyptothecium MacGregorii Broth. sp. nov.

Dioicum; robustulum, pallide viride, nitidum; *caulis secundarius* usque ad 16 cm longus, pendulus, flexuosus, laxiuscule foliosus, dense vel remote et irregulariter pinnatus, ramis patulis, vix ultra 3 cm longis, complanatulis, laxiuscule foliosis, obtusis; *folia caulina* patentia, asymmetrica, concava, superne undulata, oblongo-ligulata, late et breviter acuminata, saepe apiculata, marginibus erectis, apice minutissime serrulatis, nervo simplici, tenui, vix ultra medium folii producto, cellulis angustissimis, flexuosulis, basilaribus laxioribus, inter se porosis, infimis laxis, plerumque fusco-aureis; *bracteae perichaetii* internae erectae, elongatae, e basi longe vaginante sensim lanceolato-subulatae, integrae, nervo simplici, ad basin subulae evanido; *seta* vix ultra 0.5 mm alta, stricta; *theca* erecta, ovalis, fusca. Caetera ignota.

LUZON, Province of Benguet, Mount Pulog, *Bur. Sci. 8913 McGregor.*

Species praecedenti habitu similis, sed foliorum forma facillime dignoscenda.

NECKEROPSIS Reichdt.

Neckeropsis crinita (Griff.) Fleisch.

Neckera crinita Griff.

LUZON, Province of Nueva Ecija, Cabanatuan, *Bur. Sci. 5284 McGregor.*

Area: Assam, Ceylon, and Tonkin.

Neckeropsis Lepineana (Mont.) Fleisch.

Neckera Lepineana Mont.

LUZON, Province of Benguet, *Bur. Sci. 3387 Mearns.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

Neckeropsis gracilenta (Bryol. jav.) Fleisch.

Neckera gracilenta Bryol. jav.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

Area: Sumatra, Java, Borneo, Ceram, Celebes, and New Guinea.

HIMANTHOCLADIUM (Mitt.) Fleisch.

Himanthocladium loriforme (Bryol. jav.) Fleisch.

Neckera loriformis Bryol. jav.

LUZON, Province of Benguet, *Bur. Sci. 2856 Mearns.*

Area: Java, Ceram, Banca, Celebes, New Guinea, and the Philippines.

HOMALIODENDRON Fleisch.

Homaliodendron flabellatum (Dicks.) Fleisch.

BATANES ISLANDS, Batan, *Bur. Sci. 3864 Fénix.* LUZON, District of Lepanto, Mount Data, *For. Bur. 16019 Bacani,* altitude about 2,200 m.

Area: Nilghiri, Coorg, Ceylon, Malacca, Sumatra, Java, Ternate, Halmaheira, Saparoea, Borneo, Japan, and New Guinea.

Homaliodendron scalpellifolium (Mitt.) Fleisch.

LUZON, Province of Laguna, Mount Banajao, altitude 2,000 m, *Bur. Sci. 6598 Robinson.*

Area: Ceylon, Sumatra, Java, Amboina, Ternate, Ceram, Halmaheira, Saparoea, Borneo, Tonkin, Philippines, and Japan.

ENTODONTACEÆ.

CLASTOBRYUM Doz. & Molk.

Clastobryum (Pseudosymphyodon) robustum Broth. sp. nov.

Dioicum; robustum, caespitosum, caespitibus laxis, lutescenti-viridibus, nitidis; *caulis* elongatus, repens, fusco-radiculosus, laxiuscule foliosus, dense pinnatim ramosus, ramis plerumque usque ad 1.5 cm longis, adscendentibus, laxiuscule foliosis, sensim attenuatis, flagella brevi terminatis, superne corpusculis numerosis, filiformibus, multicellularibus, fuscis, fasciculatim confertis praeditis, rarius brevioribus, obtusis; *folia* erecto-patentia, breviter decurrentia, concava, oblongo-lanceolata, anguste acuminata, marginibus ubique anguste recurvis, superne minute serrulatis, nervis binis, brevibus, cellulis anguste linearibus, basilaribus infimis laxioribus, alaribus numerosis, laxis, quadratis vel rotundato-hexagonis, in parte decurrente rectangularibus, hyalinis vel aureis, omnibus laevissimis. Caetera ignota.

LUZON, Province of Benguet, Mount Pulog, *Bur. Sci. 8912 McGregor.*

Species statura robusta a congeneribus prima fronte jam dignoscenda.

CAMPYLODONTIUM Doz. & Molk.

Campylodontium flavescens (Hook.) Bryol. jav.

LUZON, Province of Benguet, Bugias, *For. Bur. 15987 Bacani.*

ERYTHRODONTIUM Hamp.

Erythrodontium julaceum (Hook.) Par.
LUZON, Province of Benguet, Lutab to Kabayan, *Bur. Sci. 8790 McGregor.*
Area: Nilghiri, Mysore, Nepal, Sikkim, Khasia, Assam, Tonkin, and Yunnan.

STEREOPHYLLUM Mitt.

Stereophyllum anceps (Bryol. jav.) Broth.
LUZON, Province of Nueva Ecija, Cabanatuan, *Bur. Sci. 5265 McGregor.*

FABRONIACEÆ.

MERRILLIOBRYUM Broth.

Merrilliobryum philippinense Broth.
LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16432 ex p. Curran, Merritt, & Zschokke.*

HOOKERIACEÆ.

DALTONIA Hook. & Tayl.

Daltonia revoluta Broth. sp. nov.

Autoica; tenella, caespitosa, caespitibus parvis, mollibus, lutescenti-viridibus, haud nitidis; *caulis* vix ultra 1 cm altus, suberectus, fusco-radiculosus, dense foliosus, simplex vel superne ramis brevibus, erectis, praeditus; *folia* sicca laxe adpressa, comalia saepe contorta, humida suberecta, e basi oblonga lanceolato-lingulata, breviter subulata, margin-ibus usque ad apicem revolutis, integerrimis, limbata, nervo tenui, longe infra apicem folii evanido, cellulis pellucidis, haxagono-ovalibus, teneris, basin versus multo majoribus et longioribus, marginalibus elongatis, angustis, limbum lutescentem, usque ad 5-seriatum efformantibus; *seta* vix ultra 1 cm alta, flexuosula, tenuissima, rubra, sublaevis; *theca* erecta vel suberecta, ovalis, minuta, brevicollis, atropurpurea; *operculum* luteum, e basi convexo-conica longe subulatum.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16405 Curran, Merritt, & Zschokke.*

Species *D. angustifoliae* Doz. & Molk. affinis, sed foliorum forma dignoscenda.

DISTICHOPHYLLUM Doz. & Molk.

Distichophyllum Mittenii Bryol. jav.
BATANES ISLANDS, Batan, Mount Iraya, *Bur. Sci. 3854 Fénix.*
Area: Ceylon, Java, Formosa, and New Caledonia.

HOOKERIOPSIS (Besch.) Jaeg.

Hookeriopsis geminidens Broth. sp. nov.

Species purpurascens, pulcherrima, *H. uticamundianae* (Mont.) Broth. habitu foliorumque forma et areolatione valde similis, sed foliis superne subciliato-dentatis, dentibus saepe geminatis nec non inflorescentia ut videtur dioica dignoscenda.

LUZON, Province of Benguet, *For. Bur. 15929 Bacani.*

CALLICOSTELLA (C. Müll.) Jaeg.

Callicostella papillata (Mont.) Jaeg.
Luzon, Province of Cagayan, *Bur. Sci. 7573 Ramos.*

HYPOPTERYGIACEÆ.

LOPIDIUM Hook. f. & Wils.

Lopidium javanicum Hamp.
Hypopterygium Struthiopteris Bryol. jav.
Luzon, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8701 McGregor.*
Area: Nilghiri, Ceylon, Sumatra, Java, Batjan, and New Guinea.

LESKEACEÆ.

DUTHIELLA C. Müll.

Duthiella complanata Broth. sp. nov.

Dioica; robusta, fuscescenti-viridis, haud nitida; *caules secundarii* numerosi, flexuosi, dense foliosi, superne pinnatim vel subdendroideo-ramosi, ramis complanatis, dense foliosis, brevibus, simplicibus vel longioribus, plus minusve ramulosis; *folia* sicca laxe adpressa, indistincte plicata, humida erecto-patentia, concaviuscula, e basi ovato-lanceolata sensim lanceolato-linearia, acuta, acumine saepe semitorto, marginalibus erectis, undulatis, inferne minute, superne argute et inaequaliter serratis, nervo crassiusculo, infra apicem folii evanido, cellulis anguste angulato-ellipticis, plerumque uni- vel pluripapillosis, obscuris, basin versus sensim longioribus, alaribus sat numerosis, laxe hexagono-ovalibus, marginalibus elongatis, laevissimis, limbum uniseriatum efformantibus; *bracteae perichaetii* e basi vaginante abrupte in acumen longissimum, reflexum, loriforme, serrulatum attenuatae, obsoletinerves, cellulis omnibus elongatis, laevissimis; *seta* 2.5 cm alta, laevissima; *theca* horizontalis, asymmetrica, oblongo-cylindrica, sicca deoperculata, curvatula, fusca, laevis. Caetera ignota.

Luzon, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8680, 8706 McGregor.*

Species *D. Wallichii* (Hook.) C. Müll. affinis, sed statura rubustiore ramisque complanatis oculo nudo jam dignoscenda.

PELEKIUM Mitt.

Pelekium velatum Mitt.
Luzon, Province of Camarines, *For. Bur. 12298 Curran:* Province of Laguna, Mount Maquiling, *Merrill 6315.*

THUIDIUM Bryol. eur.

Thuidium Meyenianum (Hamp.) Bryol. jav.
Luzon, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8689 McGregor.* Mindanao, District of Zamboanga, Port Banga, *For. Bur. 9085 Whitford & Hutchinson.*
Area: Java, Saparoea, Banca, and the Philippines.

Thuidium casuarinum (C. Müll.) Jaeg.

LUZON, Province of Benguet, Mount Tonglon, *Bur. Sci. 5497 Ramos,* Mount Pulog, altitude about 2,600 m, *For. Bur. 16403 Curran, Merritt, & Zschokke:* Pauai, altitude about 2,100 m, *Bur. Sci. 8676 McGregor.*

Area: Philippines.

Thuidium plumulosum (Doz. & Molk.) Bryol. jav.

LUZON, Province of Laguna, Mount Maquiling, *Merrill 6319 ex p.*

HYPNACEÆ.

MACROTHAMNIUM Fleisch.

Macrothamnium macrocarpum (Reinw. & Hornsch.) Fleisch.

LUZON, Province of Laguna, Mount Banajao, altitude about 2,000 m, *Bur. Sci. 6596 Robinson, Copeland s. n.:* District of Lepanto, Mount Data, *Bur. Sci. 5966 Ramos, For. Bur. 16017 Bacani.*

LEPTOHYMENIUM Schwaegr.

Leptohymenium tenue (Hook.) Schwaegr.

LUZON, Province of Benguet, Mount Pulog, on trees, altitude about 2,100 m, *For. Bur. 16425, 16426 Curran, Merritt, & Zschokke.*

Area: Himalaya, Nepal, Bhotan, Khasia, and Burma.

ECTROPOTHECIUM Mitt.

Ectropothecium assimile Broth. sp. nov.

Autoicum; robustiusculum, caespitosum, caespitibus laxis, albescentibus, nitidis; *caulis* elongatus, repens, per totam longitudinem fasciculatim fusco-radiculosus, dense subpinnatim ramosus, ramis et ramulis valde complanatis, cum foliis usque ad 1.5 mm latis, dense foliosis, obtusis; *folia* disticha, concava, patentia, asymmetrica, ovato-lanceolata, breviter acuminata, marginibus erectis, minutissime serrulatis, brevissime binervia, cellulis angustissime linearibus, alaribus paucis, quadratis, hyalinis, omnibus laevissimis; *bracteae perichaetii* intimae e basi lato raptim lanceolato-subulatae, filiformi-acuminatae, apice minutissime serrulatae; *seta* 12 mm, tenuissima, flexuosula, rubra, laevissima; *theca* horizontalis, minuta, ovalis, sicca deoperculata sub ore paulum constricta, fusco-rubra; *operculum* e basi convexa alte apiculatum.

LUZON, Province of Laguna, Mount Maquiling, *Merrill 6316.*

Species *E. monumentorum* (Dub.) Jaeg. valde affinis, sed foliis paulum laxius reticulatis thecaque majore dignoscenda.

Ectropothecium micropyxis Broth. sp. nov.

Autoicum; gracile, caespitosum, caespitibus mollibus, densiusculis, depressis, lutescenti-viridibus, nitidis; *caulis* elongatus, repens, flexuosus, per totam longitudinem fasciculatim fusco-radiculosus, densiuscule foliosus, pinnatim ramosus, ramis vix ultra 5 mm longis, patulis, complanatulis, simplicibus, obtusis; *folia caulina* falcatula, concaviuscula, e basi breviter decurrente, ovata subito lanceolato-subulata, filiformi-

acuminata, marginibus erectis, integris, brevissime binervia vel enervia, cellulis breviter linearibus, laevissimis, ramea brevius acuminata, summo apice serrulata; *bracteae perichaetii* internae erectae, e basi semivaginante sensim lanceolato-subulatae, filiformi-acuminatae, integrae; *seta* c. 7 mm, tenuissima, rubra, laevissima; *theca* minutissima, subnutans, ovalis, sicca deoperculata, sub ore constricta, cellulis prominentibus grosse mammillosa, atropurpurea; *operculum* e basi convexo apiculatum, grosse mammillosum.

LUZON, Province of Laguna, Mount Maquiling, *Merrill 6318 ex p.:* Province of Benguet, *For. Bur. 15768 ex p. Curran & Merritt.*

Species foliis filiformi-acuminatis nec non theca minutissima, grosse mammillosa facillime dignoscenda.

Ectropothecium callichroides (C. Müll.) Jaeg.

LUZON, Province of Albay, Mount Mayon, *Bur. Sci. 6480 Robinson.*

Area: Philippines.

Ectropothecium luzoniae (C. Müll.) Jaeg.

LUZON, Province of Laguna, Mount Maquiling, *Merrill 6318 ex p.:* Province of Benguet, *For. Bur. 15768 ex p. Curran & Merritt.*

Area: Philippines.

STEREODON (Brid.) Mitt.

Stereodon deflexifolius (Mitt.) Broth.

LUZON, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 4558 Mearns:* District of Lepanto, Mount Data, *For. Bur. 16015 Bacani.*

Area: Sikkim and Bhotan.

TRISMEGISTIA (C. Müll.) Broth.

Trismegistia lancifolia (C. Müll.) Broth.

Acanthocladium lancifolium Broth. in Philip. Journ. Sci. 2 (1907) Bot. 342.

LUZON, Province of Camarines, Maagnas, *Bur. Sci. 6320, 6356 Robinson.* NEGROS, Cadiz, *Bur. Sci. 7360 Celestino.*

Trismegistia Korthalsii (C. Müll.)

Acanthocladium Korthalsii Broth. l. c.

LUZON, Province of Laguna, Mount Maquiling, *Bur. Sci. 6623 Robinson.*

ACANTHOCLADIUM Mitt.

Acanthocladium Robinsonii Broth. sp. nov.

Dioicum; sat gracile, pallide viride, nitidum; *caulis* repens, dense fusco-radiculosus, dense ramosus, ramis usque ad 3 cm longis, densiuscule foliosis, complanatis, breviter cuspidatis, irregulariter pinnatim ramulosis, ramulis patentibus, valde complanatis, vix ultra 1 cm longis, obtusis; *folia ramea* erecto-patentia, concaviuscula, e basi ovali sensim lanceolato-subulata, marginibus erectis, superne serrulatis, nervo 0, cellulis angustissime linearibus, laevissimis, basilaribus brevioribus et laxioribus, inter se porosis, infimis aureis, alaribus c. 6, laxis, oblongis, fusco-aureis; *folia ramulina* minora et angustiora, brevius et latius acuminata, argutius serrulata; *bracteae perichaetii* internae erecto-patentes, late ovato-lanceolatae, longissime loriformi-subulatae, superne argute serrulatae, cellulis

basilaribus laxis, teneris; *seta* 4.5 cm alta, tenuissima, flexuosula, rubra, laevissima; *theca* inclinata vel ob setam apice late arcuatum pendula, asymmetrica, ovalis, brevicollis, sicca curvatula et infra orificium constrictula, atro-purpurea, haud nitida; operculum breviter conicum, obtusum, apiculatum. Planta mascula ignota.

LUZON, Province of Laguna, Mount Banajao, on trees, altitude about 1,800 m, *Bur. Sci. 6566 Robinson.*

Species pulcherrima, habitu *A. extenuato* (Brid.) Mitt. similis, sed foliorum forma et structura aliisque notis diversissima.

ISOPTERYGIUM Mitt.

Isopterygium albescens (Schwaegr.) Jaeg.

LUZON, Province of Benguet, Mount Tonglon, *Bur. Sci. 5514 Ramos.*

PLAGIOTHECIUM Bryol. eur.

Plagiothecium Miquelii (Bryol. jav.) Broth.

LUZON, Province of Cagayan, Claveria, *Bur. Sci. 7579 Ramos.*

Area: Malacca, Sumatra, Java, Banca, and Borneo.

Plagiothecium neckeroideum Bryol. eur.

LUZON, Province of Benguet, Mount Pulog, in forests, altitude about 2,600 m, *For. Bur. 16382 Curran, Merritt, & Zschokke.*

Area: Salzburg, Styria, Carinthia, Switzerland, Himalaya, and Japan.

TAXITHELIUM Spruce.

Taxithelium papillatum (Harv.) Broth.

LUZON, Province of Zambales, *Bur. Sci. 5139 Ramos:* Province of Cagayan, *Bur. Sci. 7577 Ramos.* NEGROS, Cadiz, *Bur. Sci. 7359 Celestino.*

Taxithelium (Oligostigma) spurio-subtile Broth. sp. nov.

Autoicum; tenerrimum, caespitosum, caespitibus densissimis, mollibus, lutescentibus, vix nitidiusculis; *caulis* repens, fusco-radiculosus, densissime ramosus, ramis suberectis, complanatulis, brevibus, densiuscule foliosis, vix attenuatis; *folia* sicca laxe adpressa, humida erecto-patentia, concava, e basi constricta ovata, abrupte plus minusve longe subulato-acuminata, marginibus erectis, serrulatis, enervia, cellulis angulato-oblongis vel sublinearibus, haud incrassatis, dorso papilla singula, elevata, media ornatis, basilaribus infimis abbreviatis, saepe aureis, alaribus vix distinctis; *bracteae perichaetii* internae erectae, oblongo-lanceolatae, sensim subfiliformiter attenuatae, subula serrulata, cellulis elongatis, laevibus; *seta* c. 1.5 cm alta, tenuissima, rubra, laevissima; *theca* inclinata, e collo brevi breviter oblonga, sicca deoperculata sub ore haud constricta, fusca, laevis; *operculum* e basi conica breviter rostratum.

LUZON, District of Lepanto, Mount Data, *For. Bur. 16016 Bacani.*

Species *T. subtili* (Card.) Broth. valde affinis, sed colore cellulisque foliorum haud incrassatis jam dignoscenda.

SEMATOPHYLLACEÆ.

SEMATOPHYLLUM Mitt.

Sematophyllum alto-pungens (C. Müll.) Jaeg.

LUZON, Province of Laguna, Mount Banajao, on trees, altitude about 2,000 m, *Bur. Sci. 6557, 6601 Robinson.*

Sematophyllum falcifolium Fleisch.

MINDORO, Mount Halcon, *Merrill 5705.*

Area: Java.

TRICHOSTELEUM (Mitt.) Jaeg.

Trichosteleum hamatum (Doz. & Molk.) Jaeg.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

Trichosteleum cylindricum (Reinw. & Hornsch.) Broth.

LUZON, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8707 McGregor.*

Trichosteleum Boschii (Doz. & Molk.) Jaeg.

MINDANAO, District of Zamboanga, *For. Bur. 9282 Whitford & Hutchinson.*

Area: Siam, Sumatra, Java, Borneo, and Banca.

BRACHYTHECIACEÆ.

OXYRRHYNCHIUM (Bryol. eur.) Warnst.

Oxyrrhynchium Mülleri (Bryol. jav.) Broth.

LUZON, Province of Benguet, Pauai, *Merrill 6673,* altitude about 2,100 m.

Area: Java and Sumatra.

RHACOPILACEÆ.

RHACOPILUM Palis.

Rhacopilum spectabile Reinw. & Hornsch.

LUZON, Province of Benguet, *Bur. Sci. 5869 Ramos.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

HYPNODENDRACEÆ.

HYPNODENDRON (C. Müll.) Lindb.

Hypnodendron formosicum Card.

LUZON, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8681 McGregor.*

Area: Formosa.

Hypnodendron Reinwardtii (Hornsch.) Lindb.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8186 Curran & Merritt.*

forma **breviseta** Broth.

BATANES ISLANDS, Batan, Mount Iraya, *Bur. Sci. 3849 Fénix.*

LUZON, Province of Laguna, Mount Banajao, altitude about 2,000 m, *Bur. Sci. 6599 Robinson.*

MNIODENDRON Lindb.

Mniodendron divaricatum (Hornsch. & Reinw.) Lindb.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8164, 8190 Curran & Merritt, Bur. Sci. 5142 Ramos:* Province of Laguna, Mount Banajao, *For. Bur. 7987 Curran & Merritt, Bur. Sci. 6602 Robinson:* Province of Abra, *Bur. Sci. 7313 Ramos.*

FUNGI PHILIPPINENSES.[1]

Auctoribus H. et P. Sydow.

(*Berlin, Germany.*)

BASIDIOMYCETES.

Guepinia ramosa Curr. Ind. Fung. 127, *t. 21, f. 2, 3.*

Hab. ad corticem, Luzon, Prov. Cagayan, *For. Bur. 16824 Curran,* Mar., 1909: Prov. Nueva Ecija, Cabanatuan, *Bur. Sci. 5258 McGregor,* Sept., 1908.

Cyathus Poeppigii Tul. in Ann. Sci. Nat. (1844).

Hab. ad terram, Manila, *Merrill 6685,* Jul., 1909, *Bur. Sci. 5285 McGregor.*

USTILAGINEÆ.

Ustilago tonglinensis Tracy & Earle in Bull. Torr. Bot. Club **22** (1895) 175.

Hab. in ovariis *Ischaemi aristati,* Luzon, Prov. Rizal, San Juan del Monte, *Merrill 6230,* Jun., 1908.

PHYCOMYCETES.

Synchytrium aecidioides (Peck) Lagh.

Hab. in foliis *Dolichi* spec., Luzon, Prov. Laguna, *Bur. Sci. 6540 Robinson,* Jan., 1909.

UREDINEÆ.

* **Puccinia mesomorpha** Syd. in Ann. Myc. **8** (1910) 36.

Hab. in foliis *Hypoestis* spec., Luzon, Prov. Bataan, monte Mariveles, *Merrill 6286,* Dec., 1908.

Puccinia (?) Convolvuli (Pers.) Cast. Obs. **1** (1843) 16.

Hab. in foliis *Ipomoeae umbellatae,* Luzon, Prov. Bataan, Lamao, *Merrill 6246,* Nov., 1908: Prov. Laguna, Los Baños, *Merrill 6321.*

Puccinia heterospora Berk. & Curt. in Journ. Linn. Soc. Bot. **10** (1868) 356.

Hab. in foliis *Sidae glutinosae,* Luzon, Prov. Bataan, Lamao, *Merrill 6245,* Dec., 1908.

Puccinia purpurea Cooke in Grevillea **5** (1876) 15.

Hab. in foliis *Sorghi,* Negros, *Bur. Sci. 5699 Deason,* 1908.

Uromyces Hewittiae Syd. in Ann. Myc. **4** (1906) 30.

Hab. in foliis *Hewittiae bicoloris,* Luzon, Prov. Bataan, Lamao, *Merrill 6243,* Nov., 1908.

[1] The species marked with an asterisk were published by the authors as new in a paper entitled "Fungi novi Philippinenses," Ann. Myc. **8** (1910) 36–41; these new species were based on the material here cited. E. D. M.

Uromyces Mucunae Rabh. in Hedwigia 17 (1878) 62.
Hab. in foliis *Mucunae Lyonii*, Manila, *Merrill 6231, 6324*.
Hemileia vastatrix Berk. & Br. in Gard. Chron. (1869) 1157.
Hab. in foliis *Coffeae arabicae*, LUZON, Distr. Bontoc, *For. Bur. 15957 Curran*, Jan., 1909.
Aecidium Clerodendri P. Henn. in Engl. Jahrb. 15 (1892) 6.
Hab. in foliis *Clerodendri intermedii*, Manila, *Merrill 6322*, Feb. 1909.
Uredo manilensis Syd. in Ann. Myc. 8 (1910) 36.
Hab. in foliis *Tabernamontanae coronariae*, Manila, *Merrill 6325*, Apr., 1909.
Uredo Castaneae P. Henn. in Hedwigia 47 (1908) 252.
Hab. in foliis *Castaneae vulgaris*, LUZON, Distr. Lepanto, *For. Bur. 15958 Curran*, Jan., 1909.
Uredo Kuehnii (Krueg.) Wakk. & Went. in Arch. Java Suiker-industrie (1896) Afl. 9.
Hab. in foliis *Sacchari officinarum*, LUZON, Prov. Laguna, *Bur. Sci. 6537 Robinson*, Dec., 1908.

PERISPORIACEÆ.

* **Meliola Hyptidis** Syd. in Ann. Myc. 8 (1910) 36.
Hab. in foliis *Hyptidis suaveolentis*, LUZON, *Prov.* Bataan, Lamao, *Merrill 6242*, Nov. 1908.

HYPOCREACEÆ.

Hypocrea (?) ochracea Pat. in Bull. Soc. Myc. France (1893) 155.
Hab. ad corticem, LUZON, Prov. Benguet, Pauai, *Bur. Sci. 8731 McGregor*, Jun., 1909.

VALSACEÆ.

* **Valsella Pinangae** Syd. in Ann. Myc. 8 (1910) 36.
Hab. ad truncos corticatos *Pinangae*, Manila, *Merrill 6328*, Oct., 1909.

SPHAERIACEÆ.

* **Rosellinia (Eurosellinia) procera** Syd. in Ann. Myc. 8 (1910) 37.
Hab. ad corticem, MINDANAO, Distr. Davao, *Copeland 499*, Mart. 1904.

XYLARIACEÆ.

Hypoxylon annulatum (Schw.) Mont. Syll. Crypt. (1856) 213.
Hab. ad corticem, LUZON, Prov. Benguet, Pauai, *Merrill 6667*, Maio, 1909.
Hypoxylon marginatum (Schw.) Berk. in Cuban Fungi no. 830.
Hab. ad corticem, LUZON, Prov. Benguet, Pauai, *Bur. Sci. 8717 McGregor, Merrill 6670*.
* **Hypoxylon lilliputianum** Syd. in Ann. Myc. 8 (1910) 37.
Hab. ad lignum cariosum, MINDANAO, Davao, *Copeland 656*, Sept., 1904.
* **Hypoxylon minutellum** Syd. l. c.
Hab. ad corticem, LUZON, Prov. Benguet, Pauai, *Bur. Sci. 8721 McGregor*, Jun., 1909.
Nummularia anthracodes (Fr.) Mont. in Ann. Sci. Nat. 13 (1840) 359.
Hab. ad corticem, LUZON, Prov. Benguet, *Merrill 6666*, Maio, 1909.
Daldinia concentrica (Bolt.) Ces. & DeNot. Comm. Crit. Ital. 1 (1863) 198.
Hab. ad truncos, LUZON, Prov. Bataan, Lamao, *For. Bur. 15574 Curran*. NEGROS, *Bur. Sci. 7358 Celestino*, Mart., 1909.
Daldinia Gollani P. Henn. in Hedwigia 40 (1901) 339.
Hab. ad ramos, Manila, *Merrill 6326*, Feb., 1909.

Xylaria obtusissima (Berk.) Sacc. Syll. Fung. 1 (1882) 318.

Hab. ad truncos, LUZON, Prov. Nueva Ecija, *Bur. Sci. 5242 McGregor*, Sept., 1908.

Xylaria tuberosa (Pers.) Cooke in Grevillea 11 (1883) 88.

Hab. in lignis, LUZON, Prov. Nueva Ecija, *Bur. Sci. 5234 McGregor*, Sept., 1908.

* **Xylaria (Xylostyla) gracilenta** Syd. in Ann. Myc. 8 (1910) 38.

Hab. ad frustula lignea, LUZON, Prov. Benguet, Pauai, *Merrill 6665*, Maio, 1909.

MICROTHYRIACEÆ.

* **Seynesia Scutellum** Syd. in Ann. Myc. 8 (1910) 39.

Hab. in foliis *Drimydis piperitae*, LUZON, Prov. Benguet, Pauai, *Bur. Sci. 8714 McGregor*.

HYSTERIACEÆ.

* **Lembosia congregata** Syd. in Ann. Myc. 8 (1910) 40.

Hab. in foliis *Rhododendri* spec., LUZON, Prov. Laguna, monte Banajao, *Bur. Sci. 6583 Robinson*, Jan., 1909.

DOTHIDEACEÆ.

Auerswaldia Merrillii P. Henn. in Hedwigia 47 (1908) 255.

Hab. in foliis *Freycinetiae Williamsii*, BATANES ISLANDS, *Bur. Sci. 3786a Fénix*, Jun., 1907.

* **Phyllachora aggregatula** Syd. in Ann. Myc. 8 (1910) 38.

Hab. in foliis vivis *Melastomatis fusci*, LUZON, Prov. Bataan, monte Mariveles, *Merrill 6287*, Dec., 1908.

* **Phyllachora circinata** Syd. l. c.

Hab. in foliis *Fici* spec., LUZON, Prov. Cagayan, *For. Bur. 16828 Curran*, Mart., 1909.

Phyllachora Fici-fulvae Koord. Bot. Untersuch. (1907) 182.

Hab. in foliis *Fici odoratae*, LUZON, Prov. Rizal, *Merrill 6240*, Nov., 1908.

Phyllachora Fici-minahassae P. Henn. in Hedwigia 47 (1908) 254.

Hab. in foliis *Fici odoratae*, LUZON, Prov. Laguna, monte Maquiling, *Merrill 6320*, Feb., 1909.

Phyllachora luzonensis P. Henn. in Hedwigia 47 (1908) 255.

Hab. in foliis *Millettiae* spec., LUZON, Prov. Laguna, *Copeland s. n.*, Feb., 1909.

Phyllachora Sacchari P. Henn. l. c. 41 (1902) 143.

Hab. in foliis *Sorghi halepensis*, LUZON, Prov. Laguna, Los Baños, *Bur. Sci. 6711 Robinson*, Apr., 1909.

Phyllachora topographica Sacc. Syll. Fung. 14 (1899) 669.

Hab. in foliis *Fici* spec., LUZON, Prov. Laguna, *Copeland s. n.*, Jan., 1909.

BULGARIACEÆ.

* **Bulgaria pusilla** Syd. in Ann. Myc. 8 (1910) 40.

Hab. ad corticem, LUZON, Prov. Benguet, Pauai, *Bur. Sci. 8722 McGregor*, Jun., 1909, *Merrill 6669*, Maio, 1909.

GEOGLOSSACEÆ.

Gloeoglossum glutinosum (Pers.) Durand in Ann. Myc. 6 (1908) 419.

Hab. ad terram, LUZON, Prov. Laguna, monte Banajao, *Copeland 2113*, Dec., 1908.

MOLLISIACEÆ.

* **Mollisia ravida** Syd. in Ann. Myc. **8** (1910) 40.

Hab. in foliis vivis *Lagerstroemiae speciosae*, LUZON, Prov. Bataan, Lamao, *Merrill 6244*, Nov., 1908.

DEUTEROMYCETES.

* **Cytospora calami** Syd. in Ann. Myc. **8** (1910) 41.

Hab. ad culmos *Calami* spec., LUZON, Prov. Bataan, monte Mariveles, *Merrill 6264*, Dec., 1908.

* **Melasmia exigua** Syd. in Ann. Myc. **8** (1910) 41.

Hab. in foliis *Loranthi* spec., LUZON, Prov. Benguet, monte Pulog, *For. Bur. 16448 Curran, Merritt, & Zschokke*, Jan., 1909.

* **Septogloeum aureum** Syd. in Ann. Myc. **8** (1910) 41.

Hab. in ramis *Hopeae acuminatae*, LUZON, Prov. Bataan, monte Mariveles, *Merrill 6265*, Dec., 1908.

Ephelis pallida Pat. in Journ. de Bot. (1897) 372.

Hab. in inflorescentiis *Andropogonis aciculati*, LUZON, Prov. Benguet, Lutab ad Kabayan, *Bur. Sci. 8786 McGregor*, Jun., 1909.

Cercospora personata (B. & C.) Ellis in Journ. Myc. (1885).

Hab. in foliis *Arachidis hypogaeae*, Manila, *Merrill 6327*, Apr., 1909.

Hadronoma orbiculare Syd. in Ann. Myc. 7 (1909) 172.

Hab. in foliis *Quercus* spec., LUZON, Prov. Benguet, Pauai, *Bur. Sci. 8711 McGregor*, Jun., 1909.

Helminthosporium Ravenelii Curt. & Berk. North Amer. Fungi no. 628.

Hab. in inflorescentiis *Sporoboli elongati*, LUZON, Prov. Benguet, *For. Bur. 15642 Curran*, Dec., 1908.

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VOL. V AUGUST, 1910 No. 3

NEW OR NOTEWORTHY PHILIPPINE PLANTS, VIII.

By E. D. MERRILL.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

The following paper is largely composed of the descriptions of about 100 new species of Philippine plants, that have been worked out from time to time during the past year. In the paper will also be found the descriptions of four proposed new genera, *Astrocalyx* and *Cephalomedinilla* of the *Melastomataceae, Curraniodendron* of the *Saxifragaceae,* and *Pygmaeopremna* of the *Verbenaceae.* A number of species previously described by various authors are here recorded from the Philippines for the first time, while several previously considered Philippine forms are admitted for the purpose of discussion, additional data being available. Following the rules of priority in nomenclature, a few new combinations have been made.

GRAMINEÆ.

ANDROPOGON Linn.

Andropogon citratus DC. Cat. Hort. Monsp. (1813) 78.

Cymbopogon citratus Stapf in Kew Bull. (1906) 322, 357, cum lamina.

Andropogon schoenanthus Blanco Fl. Filip. (1837) 39, ed. 2 (1845) 27, ed. 3, 1 (1877) 50; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 339, non Linn.

This species is commonly cultivated in the Philippines, although not on a commercial scale. I have never seen it in flower, but chemical analysis of the oil extracted from it shows the species to be *Andropogon citratus* DC., and not *A. schoenanthus* Linn.

DIGITARIA Scop.

Digitaria ciliaris (Retz.) Pers. Syn. 1 (1805) 85.

Panicum ciliare Retz. Obs. 4 (1786) 16.

Paspalum sanguinale var. *ciliare* Hook. f. Fl. Brit. Ind. 7 (1897) 15.

LUZON, Province of Ilocos Norte, Bambam, *Bur. Sci. 7661 Ramos*, March, 1909: Province of Rizal, *Phil. Pl. 147 Merrill.*

Not previously reported from the Philippines; widely distributed in the Indo-Malayan region, extending to Polynesia.

PANICUM Linn.

Panicum psilopodium Trin. Gram. Panic. (1826) 217; Hook. f. Fl. Brit. Ind. 7 (1897) 46.

LUZON, Province of Benguet, Baguio, *Williams 1182, Elmer 6589.*

This species has previously been reported from the Philippines, but apparently on a wrong identification. The specimens here referred to Trinius' species are considerably smaller than the typical form.

India to Ceylon, Burma, and Malacca.

ISACHNE R. Br.

Isachne incrassata (Hack.) comb. nov.

Isachne debilis Rendle var. *incrassata* Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 268; Merr. l. c. 350.

Tufted, erect, rather stiff, the culms simple or slightly branched, their lower nodes sometimes decumbent, glabrous. Leaves rigid, mostly spreading, lanceolate, sharply acuminate, 2.5 to 5 cm long, 2 to 4.5 mm wide, the lower surface puberulent or pubescent, the nerves obscure, the upper surface glabrous, minutely scabrid, the nerves distinct, close, about 20, margins thickened and cartilaginous, scabrid; sheaths subglabrous, or with few to rather many, long, white hairs, especially on the margins. Panicles exserted, peduncled, subpyramidal, 5 cm long or less, the branches spreading or ascending, slender, glabrous, 2 cm long or less, each branch with 8 spikelets or less, the pedicels 1 to 3.5 mm long, glabrous. Spikelets oblong-obovoid, usually dark-purple, sometimes pale, 1.2 to 1.5 mm long. Empty glumes glabrous, obscurely 5- to 7-nerved. First flowering glume elliptic-oblong, rounded, glabrous, sessile, inclosing a ♂ flower, the second minutely pedicelled, similar to the first but slightly smaller, inclosing a ♀ flower.

The type of Doctor Hackel's variety was a rather poor specimen collected in Mindanao, Mount Apo, *DeVore & Hoover 358.* Better material has been recently collected in Negros, *Merrill 6977*, Canlaon Volcano, on ledges in the Nahalin River, altitude about 1,260 m, and after studying this specimen I have concluded that the form is not closely allied to *Isachne debilis* Rendle, but that it is worthy of specific rank.

Isachne micrantha sp. nov.

Annua, debilis, parva, vix 10 cm alta, caulibus tenuibus, ramosis, glabris; foliis oblongis vel oblongo-lanceolatis, circiter 1 cm longis, leviter pilosis, vaginis quam internodia brevioribus; paniculis depauperatis, stric-

tis, compressis, paucifloris; spiculis obovoideis, 1 ad 1.2 mm longis, glumis sterilibus obscurissime 5-nerviis, subglabris, fertilibus densissime et breviter pubescentibus.

An annual, weak, ascending, loosely tufted plant, 10 cm or less in height. Stems very slender, glabrous, branched, the lower parts decumbent and often rooting at the nodes. Leaves oblong to oblong-lanceolate, about 1 cm long, often shorter, rarely 1.5 cm in length, 2 to 3.5 mm wide, the base rather broad, apex acuminate, both surfaces with scattered, white, rather soft hairs about 1 mm long, the nerves about 10, the margins minutely scabrid; sheaths shorter than the internodes, less than 1 cm long, with few, scattered, long, white hairs, especially on the margins; ligule of few white hairs. Panicles strict, narrow, glabrous, less than 1 cm long, the branches few, 4 mm long or less, each with from 1 to 3 or 4 spikelets, apparently never spreading, the pedicels 1 to 2 mm long, glabrous. Spikelets obovoid, pale or slightly purplish, 1 to 1.2 mm long, the empty glumes subglabrous, or at least with only a few scattered hairs in the upper part, very obscurely 5-nerved or nerveless. Flowering glumes densely and apparently softly pubescent with short hairs, 1 mm long, the second very minutely pedicelled; paleas slightly pubescent.

LUZON, Province of Cagayan, Mount Cueva, *For. Bur. 16837, 16841* (type) *Curran*, March 9, 1909, altitude about 300 m.

A species well characterized by its small size, small leaves, contracted panicles, and densely pubescent flowering glumes. It is probably more closely allied to *Isachne debilis* Rendle, of Formosa, than any other Philippine form at present known, but seems to be distinguished by its contracted panicles, smaller leaves and smaller spikelets. Among the Philippine species it is perhaps most closely allied to *Isachne myosotis* Nees.

Isachne vulcanica sp. nov.

Densissime caespitosa, perennis, rigida; culmis inferne ramosis, rigidis, vix 10 cm altis; foliis rigidis, lanceolatis, acuminatis, 1 ad 2.5 cm longis, 2 ad 5 mm latis, scabridis, margine incrassatis, vaginis quam internodia longioribus; paniculis oblongis, congestis, 1 ad 2 cm longis, usque ad 1 cm diametro; spiculis atropurpureis vel rariter pallidis, densissime dispositis, 2 mm longis; glumis exterioribus 7-nerviis, subglabris, fertilibus obscure sparseque pubescentibus.

A densely caespitose, rigid perennial, forming tufts a few centimeters in diameter or mats which are often 0.5 m in diameter. Culms rigid, much branched below, not exceeding 10 cm in height, often much shorter, the internodes short. Leaves rigid, lanceolate, acuminate, 1 to 2.5 cm long, 2 to 5 mm wide, the margins thickened, cartilaginous, scabrid, the upper surface prominently ribbed with about 18 nerves, scabrid, beneath slightly hispidulous; sheaths exceeding the internodes, imbricate, with scattered, long white hairs, the marginal hairs more numerous; ligule of few stiff, white hairs 2 to 3 mm long. Panicles slightly or not at all exserted, oblong, very dense, purple, 1 to 2 cm long, 0.5 to 1 cm in

diameter, the lower branches often 1 cm long, closely appressed, the rachis and branches glabrous, the pedicels 0.3 to 1.5 mm long. Spikelets numerous, ovate to oblong-ovate, 2 mm long, usually dark-purple, sometimes greenish. Empty glumes subequal, 7-nerved, glabrous except for few long hairs on the apical parts. Third glume elliptic-oblong, 1.8 mm long, with very few, obscure, short hairs, the margins obscurely ciliate, the palea as long as the glume, inclosing a ♂ flower. Fourth glume similar to the third, slightly shorter, containing a ♀ flower.

NEGROS, Canlaon Volcano, *Merrill 6975*, April, 1910.

Abundant in the old crater, on bare slopes and on debris washed down from the new cone, forming dense tufts or mats, altitude 1,800 to 2,100 m. A species well characterized by its dense panicles, short, rigid, densely caespitose habit, rigid, crowded leaves, and dark-purple spikelets.

MISCANTHUS Anderss.

Miscanthus depauperatus sp. nov.

Culmis erectis vel suberectis, usque ad 60 cm altis, densissime caespitosis, vix 3 mm diametro; foliis 3 ad 6 mm latis, margine scabridis; spiculis purpureis, 6 mm longis; paniculis laxis, racemis paucis, racemoso-dispositis, solitariis vel inferioribus binis, usque ad 15 cm longis.

A densely caespitose perennial, forming tufts up to 1 m in diameter, the culms erect or ascending, usually about 40 cm high, often shorter, rarely 60 cm in height, simple or very rarely branched, terete, 2 to 2.5 mm in diameter. Leaves numerous, those of the culm up to 30 cm long, 6 mm wide, the basal ones much shorter and usually narrower, scabrid on the margins, long- and slenderly acuminate; sheaths exceeding the internodes, the lower ones usually purplish; ligules broad, about 2 mm long, margins ciliate. Panicles exserted or not, glabrous, the rachis and branches angled, purple, minutely scabrid on the angles, the rachis always less than 5 cm in length, the branches rather slender, erect or somewhat spreading, solitary, or the lower ones in pairs, 3 or 4 to about 9 in number, 4 to 15 cm in length. Spikelets purple, lanceolate, acuminate, about 6 mm long, the shorter pedicels about 2 mm long, the longer ones 5 to 6 mm long, the involucral hairs slender, about as long as the spikelets, usually purplish, unequal in length, numerous. First two glumes lanceolate, sharply acuminate, equal, about 6 mm long, when spread 2.3 mm wide, purple, shining, glabrous, or the margins with very few ciliate hairs, the first obscurely 5-nerved, the second obscurely 3-nerved. Third glume oblong-lanceolate, hyaline, 5 mm long, 2 mm wide, acuminate, 1-nerved, margins slightly ciliate, empty. Fourth glume hyaline, lanceolate, acuminate, 4 mm long, 1 mm wide, apex cleft into two slender teeth and bearing between them a slender, scabrid, twisted awn about 1 cm in length. Palea ovate, hyaline, 1 mm long. Lodicules truncate, about 0.8 mm long. Anthers 3, 2.5 to 3 mm long.

NEGROS, Canlaon Volcano, common in open places in the old crater, altitude

about 1,800 m, ascending the new cone to an altitude of about 2,000 m, *Merrill*, April 12, 1910.

This species is manifestly allied to *Miscanthus sinensis* Andr., differing in its densely tufted habit of growth, very much smaller size, narrower leaves, rather lax, depauperate panicle, solitary or at most paired panicle-branches, and larger spikelets.

SPOROBOLUS R. Br.

Sporobolus virginicus (L.) Kunth Rev. Gram. (1829) 67; Enum. 1 (1833) 210; Hook. f. Fl. Brit. Ind. 7 (1897) 247.

Agrostis virginica Linn. Sp. Pl. (1753) 63.

LUZON, Province of Cagayan, *Bur. Sci. 7881 Ramos*, April, 1909; also collected by Loher at Navotas, Province of Rizal, *nos. 1785, 1786* in Herb. Kew; Manila, *Merrill*, June, 1910.

Not previously reported from the Philippines; widely distributed in temperate and tropical parts of the world.

CYPERACEÆ.

CLADIUM Schrad.

Cladium philippinense sp. nov. § *Eucladium.*

Dense caespitosum, culmis gracilibus, teretibus, usque ad 2 m altis, 2 ad 3 mm diametro; foliis radicalibus nullis, caulinis 2 vel 3, brevibus, verticaliter compressis, 1 ad 5 cm longis, vix 3 mm latis; inflorescentiis laxis, 10 ad 15 cm longis, "zigzag"; spiculis brunneis, circiter 2 mm longis; fructibus ellipsoideis, teretibus, admodum nitidis, rugosis, apice truncatis.

A densly caespitose plant from creeping rhizomes, the culms rush-like, often nearly 2 m high, sometimes shorter, terete, glabrous, 2 to 3 mm in diameter, their bases covered with several short, imbricated bracts, leafless except for the 2 or 3 culm leaves which are much reduced or sometimes represented only by sheaths, or sometimes 5 cm long, always less than 3 mm wide, vertically compressed, glabrous. Panicles 10 to 15 cm long, interrupted, thyrsoid, lax, both the primary and secondary rachises strongly zigzag, on the ultimate branches each group of two or three spikelets subtended by an ovate, keeled, brown, prominently acuminate bract about 3 mm long, the basal portion broad, 7- to 9-nerved, the spikelets sessile or shortly pedicelled, crowded. Spikelets brown, glabrous, 2 to 2.5 mm long, each bearing a single perfect flower, the glumes few, about four, ovate to oblong-ovate, somewhat acuminate, keeled, 2 mm long. Nutlet ellipsoid, terete, straw-colored, somewhat shining, about 1.8 mm long, wrinkled when dry, the base somewhat acute, the apex minutely puberulent, truncate or rounded; style filiform, elongated, the arms three.

MINDORO, southwest of Lake Naujan, altitude about 120 m, *For. Bur. 6724 Merritt*, April, 1907 (type). LUZON, Province of Zambales, along streams near Candelaria, *Bur. Sci. 4729 Ramos*, December, 1907. PALAWAN, Mount Victoria, on rocks at base of waterfall, *Bur. Sci. 718 Foxworthy*, March, 1906, altitude

about 600 m; Iwahig, in bed of mountain stream, altitude about 300 m, *Merrill 758*, February, 1903, specimen very young.

This species is probably most closely allied to *Cladium riparium* Benth., of Australia, and to the var. *crassum* (Thwaites) Clarke of India and Ceylon; it is, apparently, distinct from both forms. Among the Philippine species it is probably most closely allied to *Cladium distichum* Clarke but lacks the numerous imbricated glumes of that species.

Cladium filiforme sp. nov. § *Eucladium*.

Caespitosum, tenerum, circiter 40 cm altum; foliis angustis, planis, elongatis, in sicco plus minus plicatis, margine scabridis; paniculis laxis, angustis, thyrsoideis; spiculis paucis, lanceolatis, brunneis, circiter 5.5 mm longis, 1-floris; fructibus nitidis, ovoideis vel ellipticis, albidis, sessilibus, vix rostratis.

A caespitose perennial about 40 cm high, slender. Stems terete, about 1.5 mm in diameter. Leaves mostly basal, slender, about 20 cm long, 1.5 mm wide, scabrid, apparently plane when fresh, more or less folded when dry, the culm leaves two or three, similar to the basal ones. Panicles slender, thyrsoid, comparatively few-flowered, narrow, rather lax. Spikelets lanceolate, brown, 5 to 6 mm long, their pedicels slender, 2 to 8 mm in length, each group of three or four spikelets subtended by a setaceous, scabrid, leaf-like bract 1 cm long or less. First two glumes empty, lanceolate-ovate, acuminate, about 3 mm long. Third glume inclosing a perfect flower, narrowly oblong, acuminate, 3.5 mm long, thicker than the empty glumes. Stamens three; anthers linear, 2 mm long. Nutlet ovoid or ellipsoid, white and shining, sessile, not beaked, glabrous; style 5 mm long, divided to the middle into three arms. Fourth glume similar to the third, empty, the fifth smaller and thinner, also empty.

PALAWAN, Mount Victoria, *Bur. Sci. 717 Foxworthy*, March 24, 1906, on rocks at base of a waterfall, altitude about 600 m.

A species characterized by its slender habit, slender leaves and panicles, somewhat resembling *Cladium undulatum* Thwaites but smaller and with no traces of hypogynous bristles.

SCIRPUS Linn.

Scirpus lacustris Linn. Sp. Pl. (1753) 48; Clarke in Hook. f. Fl. Brit. Ind. 6 (1893) 658.

LUZON, Province of Cagayan, Buguey, *For. Bur. 17290 Curran*, March, 1909, a common and conspicuous plant in lagoons back of the town.

Frequent in fresh water nearly throughout the world, except South America and Malaya. Not previously reported from the Philippines.

XYRIDACEÆ.

XYRIS Linn.

Xyris anceps Lam. Ill. 1 (1791) 132; Hook. f. Fl. Brit. Ind. 6 (1892) 364.

LUZON, Province of Isabela, Carig, *Bur. Sci. 8065 Ramos*, May, 1909. SEMERARA, *Merrill 4151*, June, 1905.

Not previously reported from the Philippines, and the second species definitely known to occur in the Archipelago; India to Burma, the Malay Peninsula and Archipelago.

LILIACEÆ.

SMILAX Linn.

Smilax verruculosa sp. nov. § *Eusmilax.*

Species S. bracteatae Presl valde affinis, differt ramis ramulisque dense verruculosis et spinis plus minus numerosis armatis.

Scandent, the branches and branchlets yellowish or brownish, rather slender, terete, or the latter slightly sulcate, densely verruculose and with numerous, straight or slightly curved, sharp spines 1 to 3 mm long. Leaves broadly ovate to elliptic-ovate, coriaceous, shining, 6 to 10 cm long, 4 to 7 cm wide, the base rounded or acute, the apex shortly and abruptly apiculate-acuminate, the acumen thickened; nerves 5, the outer pair faint, submarginal, the inner three stout, prominent, the inner pair leaving the middle one just above the base, the reticulations lax, prominent; petioles about 1 cm long, the lower half inflated, somewhat clasping the stem, some tendril-bearing at about the middle, others simply auriculate. Inflorescence axillary, solitary, the rachis emerging from between two, ovate, coriaceous, 4 to 5 mm long bracts, each inflorescence consisting of from 1 to 4 racemosely disposed, peduncled umbels, the peduncles to the umbels subtended by small bracts, solitary. Flowers 10 to 20 in each umbel, 3.5 to 4 mm long, the perianth-segments reflexed. Ovary-cells 1-ovuled. Fruit ovoid, about 3.5 long, 1-seeded.

LUZÓN, Province of Benguet, Baguio, *Topping 13* (type), *Elmer 5820, 8572, Williams 1046, Bur. Sci. 2810, 3378 Mearns, For. Bur. 15617 Curran.*

Most of the above specimens have been distributed as *Smilax bracteata* Presl, from which the present species is at once distinguished by its densely verruculose and more or less spiny branches and branchlets. The terminal undeveloped bud is sometimes present on the racemes, but more often absent, or developed into an umbel.

Smilax williamsii sp. nov. § *Eusmilax.*

Frutex alte scandens, ramis ramulisque teretibus vel leviter striatis, verruculosis, vix spinosis; foliis amplis, late elliptico-ovatis, chartaceis vel subcoriaceis, basi acutis vel subcordato-rotundatis, apice abrupte apiculatis, nervis 5 vel 7; inflorescentiis axillaribus, solitariis, umbellis 1 vel 2, racemoso-dispositis.

A scandent shrub, the branches and branchlets terete, or slightly striate, pale-brown, densely verruculose, not spiny. Leaves alternate, ample, broadly elliptic-ovate, chartaceous or subcoriaceous, 9 to 15 cm long, 5 to 11 cm wide, shining, base acute or subcordate-rounded, the apex shortly and abruptly apiculate; primary nerves 5, basal, prominent, with an additional pair of fainter submarginal nerves, the reticulations distinct; petiole 1.5 to 2 cm long, the lower half inflated, clasping the stem, auriculate or tendril-bearing at about the middle, curved. Racemes

axillary, solitary, the rachis emerging from between the petiole and an ovate, coriaceous, 5 to 7 mm long bract, the umbels 1 or 2, the terminal bud wanting, the peduncles to the umbels solitary, subtended by bracts, slender, 2.5 cm long. Staminate flowers 20 to 25 in each umbel, about 7 mm long, the perianth segments reflexed; stamens 6. Fruit globose, much wrinkled when dry, with from 1 to 3, more or less compressed, 4 mm long seeds.

MINDANAO, Lake Lanao, *Mrs. Clemens 751*, near streams, September, 1906: District of Davao, *Williams 2519*, March, 1905 (type).

A species manifestly allied to *Smilax bracteata* Presl, but distinguished at once by its verruculose, but not spiny stems, larger leaves with more numerous veins, and larger flowers.

ULMACEÆ.

CELTIS Linn.

Celtis crenato-serrata sp. nov.

Arbor circiter 30 m alta, glabra, vel ramulis ultimis parce pubescentibus; foliis subcoriaceis, ovatis vel elliptico-ovatis, acuminatis, basi rotundatis, leviter inaequilateralibus, 3-nerviis, margine in tertia inferiore parte integris, supra valde crenato-serratis; fructibus ovatis, leviter compressis, circiter 1 cm longis.

A glabrous tree about 30 m high. Branches slender, terete, reddish-brown, distinctly lenticellate with small lenticels, the ultimate branchlets slightly pubescent. Leaves ovate to elliptic-ovate, 7 to 10 cm long, 3 to 5 cm wide, subcoriaceous, slightly shining, of the same color on both surfaces or slightly paler beneath, the base broad, somewhat inequilateral, rounded on one side of the midrib, subacute on the other side, the apex prominently acuminate, the acumen 1 to 1.5 cm long, apiculate, the margins in the lower one-third entire, above prominently crenate-serrate; basal nerves three, prominent, the two lateral ones extending nearly to the apex and above somewhat looped at the anastomoses of the lateral veins, the lateral ones slender, horizontal, about 10 to 12 on each side of the midrib, the reticulations lax, indistinct; petioles 5 to 7 mm long. Flowers unknown. Fruits ovate, slightly compressed, about 1 cm long, the pericarp thin, fleshy.

LUZON, Province of Bataan, Duale, *For. Bur. 20043 Topacio*, October 2, 1909, in forests along streams, altitude about 100 m, locally known as *malabatulan*.

A species well characterized by its prominently crenate-serrate leaves.

ARISTOLOCHIACEÆ.

ARISTOLOCHIA Linn.

Aristolochia macgregorii sp. nov. § *Diplolobus*.

Foliis subtus ad costam, ramulis inflorescentiis petiolisque plus minus breviter hirsuto-pubescentibus; foliis chartaceis, oblongis, basi subsagittato-cordatis, apice breviter acute acuminatis, petiolo vix 5 mm longo; racemis axillaribus, solitariis, floribus circiter 4 cm longis.

Apparently scandent. Branches terete, grayish, slightly striate, slightly zigzag, the leaf-bearing branchlets more or less densely pubescent with short brownish hairs. Leaves oblong, 11 to 17 cm long, 4.5 to 6.5 cm wide, chartaceous, shining when dry, above entirely glabrous, beneath somewhat hirsute-pubescent with short hairs on the midrib and primary nerves, the apex shortly and sharply acuminate or merely acute, the base sagittate-cordate, the auricles broad, rounded, the sinus somewhat obtuse, about 1 cm deep, the auricles somewhat surrounding the stems but free from them; basal nerves two or three pairs, the lower pair or pairs short, the upper pair reaching to about the middle of the leaf, the primary nerves above the basal ones 3 or 4 on each side of the midrib, anastomosing, the reticulations lax; petioles pubescent, less than 5 mm long. Inflorescence axillary, solitary, simply racemose, the rachis 1 to 1.5 cm long, pubescent, the pedicels about 3 mm in length, each opposed by an ovate-lanceolate, acuminate bract, the lower ones 6 mm long, the upper gradually shorter. Flowers 4 cm long, the basal 4 mm ovoid, narrowed and tubular above, the tube about 16 mm long, 2 to 2.5 mm in diameter, the upper portion expanded, the lip pubescent, lanceolate, acuminate, about 2 cm long, 3 mm wide. Column very obscurely lobed. Anthers 6, 1 mm long. Fruit (immature) obovoid, 1.5 cm long.

BABUYANES ISLANDS, Dalupiri, *Bur. Sci. 10656 McGregor*, August 20, 1909.

A species manifestly allied to *Aristolochia tagala* Cham., but at once distinguished by its differently shaped leaves, which are pubescent on the nerves beneath, very short petioles, dense racemes, and quite different flowers.

CHENOPODIACEÆ.

CHENOPODIUM Linn.

Chenopodium polyspermum Linn. Sp. Pl. (1753) 220.

LUZON, Province of Benguet, Baguio, *Leon Guerrero*, March, 1910.

In waste places, apparently of recent introduction; a widely dispersed European weed, introduced and now widely distributed in eastern North America.

NYCTAGINACEÆ.

PISONIA Linn.

Pisonia gammillii sp. nov.

Arbor glabra, inflorescentiis exceptis, circiter 10 m alta; foliis oblongo-ellipticis, in sicco chartaceis, nitidis, breviter acuminatis, basi inaequilateralibus, acuminatis, usque ad 20 cm longis; inflorescentiis laxis, terminalibus axillaribusque; floribus hermaphroditis; staminibus 12 vel 13, breviter exsertis.

A glabrous tree, except the inflorescence, unarmed, about 10 m high, the trunk 40 cm in diameter. Leaves mostly opposite, oblong-elliptic, ample, 17 to 20 cm long, 8 to 10.5 cm wide, when dry chartaceous and somewhat shining, apparently somewhat fleshy when fresh, entire, the apex shortly acuminate, the base acuminate-decurrent, inequilateral;

lateral nerves 8 or 9 on each side of the midrib, distant, rather distinct, anastomosing, the reticulations obsolete; petioles 1 to 2 cm long. Inflorescence axillary and terminal, the branches and branchlets umbellately arranged, ample, lax, nearly as long as the leaves, the axillary peduncles 1 or 2, the terminal ones about 5, the younger parts ferruginous-pubescent, the peduncles 9 to 11 cm long, with or without a single node; primary branches umbellately disposed, 4 or 5, 1.5 to 3 cm long, spreading, each bearing from 2 to 5 umbellately disposed secondary branches 6 to 12 mm in length. Flowers white, fragrant, 2 to 6 at the tips of the ultimate branchlets, the perianth 6 to 7 mm long, the pedicels 2 to 3 mm long, puberulent. Perianth urceolate, the throat up to 5 mm in diameter, the lobes 5, spreading or somewhat reflexed, 2 to 2.5 mm broad, about 1 mm long, apiculate. Ovary and style about 5 mm long; stigma fimbriate, about 2 mm in diameter. Stamens 12 or 13; filaments slender, glabrous, somewhat united below, unequal, 4 to 6 mm long, somewhat exserted; anthers 0.8 mm. long. Fruit unknown.

GUIMARAS, Nagaba, *For. Bur. 288 Gammill*, February 22, 1904, in upland valleys, altitude about 50 m, locally known as *anuring*.

A species well characterized by its ample leaves and very lax inflorescence. Its flowers are apparently all hermaphrodite. Manifestly allied to *Pisonia umbellifera* (Forst.) Seem. (*P. excelsa* Bl.), but with more numerous stamens, larger flowers, and quite different inflorescence.

MAGNOLIACEÆ.

KADSURA Juss.

Kadsura paucidenticulata sp. nov.

Frutex scandens, glaber; foliis ellipticis vel anguste obovato-ellipticis, acuminatis, chartaceis; floribus masculinis terminalibus, solitariis, circiter 2 cm diametro, pedicellis ebracteolatis, sepalis petalisque vix vel obscure puncticulatis.

A scandent glabrous shrub. Branches terete, with scattered large lenticels, dark-colored when dry. Leaves mostly on short lateral branchlets, elliptic or narrowly obovate-elliptic, chartaceous, 4 to 7 cm long, 2.5 to 3.5 cm wide, minutely glandular-puncticulate, somewhat shining, the apex abruptly short-acuminate, the base acute, the margins in the upper half with few, scattered, small teeth; lateral nerves 5 to 7 on each side of the midrib, not prominent, not much more distinct than are the primary reticulations; petioles 0.4 to 0.7 mm long. Staminate flowers solitary, about 2 cm in diameter, terminating the stems and the short lateral branches, the pedicels about 12 mm long, ebracteolate. Sepals about 5, ovate to elliptic-ovate, obtuse or rounded, the outermost one 3 mm long and 2 mm wide, the inner ones gradually larger, the largest about 8 mm long, 6 mm wide, very obscurely or not glandular-punctate, margins minutely ciliate. Petals about 7, the outer four narrowly obovate

or oblong-obovate, thick, 10 mm long, 6 mm wide, broad and rounded at the apex, the margins glabrous, the inner three similar but smaller, 8 mm long or less. Stamens many, united into a rather dense, depressed-globose head, the connectives very broad, the anthers 0.8 mm long.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 8498 McGregor*, June, 1909, altitude about 2,100 m.

A species allied to *Kadsura philippinensis* Elmer, differing especially in its terminal, comparatively short-pedicelled flowers and other minor characters.

Kadsura macgregorii sp. nov.

Species praecedenti simillima et ut videtur valde affinis, sed differt floribus masculinis axillaribus, breviter pedicellatis, pedicellis basi bracteolis imbricatis praeditis.

Scandent, glabrous, the branches dark-colored, lenticellate. Leaves similar in shape and size to those of the preceding species, membranaceous, rather densely and minutely glandular-punctate, the margins in the upper half with scattered, small teeth. Staminate flowers solitary, in the axils of leaves or of fallen leaves, their pedicels about 5 mm long, each subtended by several, densely imbricated, brown bracteoles about 1 mm long and longer than wide, and with a similar one at about the middle of the pedicel. Sepals about 5, orbicular or broadly orbicular-ovate, minutely and densely glandular-punctate, rounded, the outer one about 2 mm long, the inner gradually larger, the innermost about 8 mm long, their margins minutely ciliate. Petals about 5, somewhat larger than the inner sepals, distinctly and densely glandular-punctate. Stamens united in a globose mass, the connectives very broad.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 8340, McGregor*, June, 1909, altitude about 2,100 m.

A species in general appearance quite similar to *Kadsura paucidenticulata*, but at once distinguished by its axillary, short-pedicelled staminate flowers, and by its pedicels subtended by several, small, imbricated bracts. It is apparently more closely allied to *Kadsura philippinensis* Elmer, than is the preceding species, judging from the attachment of the flowers, but its short-pedicelled flowers and denticulate leaves are sufficient to distinguish the two species.

SAXIFRAGACEÆ.

CURRANIODENDRON gen. nov.

Genus Dedeae Baill. valde affine, sed differt floribus 4-meris, ovulis numerosis, usque ad 16.

Curraniodendron dedeaeoides sp. nov.

Arbuscula glabra, dioica, 2 ad 3 m alta, ramulis foliisque junioribus plus minus resinosis; foliis alternis, oblongis vel oblongo-ellipticis, leviter acuminatis, chartaceis vel subcoriaceis, nitidis, subtus plus minus nigro-glandulosis; racemis axillaribus, solitariis, floribus femineis parvis, 4-meris.

A glabrous dioecious shrub 2 to 3 m high, glabrous, the young branches and leaves more or less resinous, shining. Branches terete, slender, dark-colored and longitudinally striate when dry, with scattered lenticels, the young branchlets somewhat compressed and angular. Leaves alternate, oblong to oblong-elliptic, chartaceous or subcoriaceous, 6 to 11 cm long, 2 to 3.2 cm wide, entire, the apex shortly and not prominently acuminate, the base acute or somewhat decurrent-acuminate, shining, somewhat paler beneath when dry, and at least the older leaves with numerous, small, black glands on the under surface at the intersections of the ultimate reticulations; primary lateral nerves about 12 on each side of the midrib, not prominent, spreading, obscurely anastomosing, the secondary alternating ones often nearly as prominent, the ultimate reticulations rather dense, fine, the basal pair of nerves ascending, anastomosing with the other lateral nerves shortly above the base of the leaf; petioles 1 to 2 cm long; stipules none. Racemes axillary, solitary, 5 to 7 cm long, more or less resinous, as are the buds and young flowers. Pistillate flowers alternate, 4-merous, whitish, rather scattered, solitary or sometimes two in the axil of each bracteole, the bracteoles oblong-ovate, about 1.5 mm long, 1 mm wide, deciduous, the pedicels 2 to 3 mm long. Calyx-tube funnel-shaped, about 2 mm long and wide, bearing four broadly triangular-ovate, 0.5 mm long lobes. Petals 4, alternating with the calyx-lobes, oblong-ovate, obtuse, about 2 mm long, 1.3 mm wide, attached by a broad base, spreading or reflexed, in bud distinctly imbricate. Imperfect stamens 4, alternating with the petals, the filaments about 1 mm long; anthers 0.8 mm long, oblong-ovate, basifixed, bearing no pollen. Ovary half inferior, the free portion broadly conical, somewhat sulcate, glabrous, 1-celled, with 4 or 3 prominent parietal placentae; ovules 16 or 12, attached to the introflexed margins of the placentae, ascending, imbricate; styles 4 or 3, entirely connate into a sulcate, 1 mm long column, bearing 4 or 3 minutely papillate, depressed-hemispheric stigmas. Staminate flowers and fruits unknown.

NEGROS, Mount Marapara, *For. Bur. 13634 Curran & Foxworthy,* September 8, 1909, in the mossy forest of the summit, altitude about 1,300 m.

This proposed new genus is manifestly closely allied to *Dedea* Baill., a genus of two or possibly three species confined to New Caledonia. It differs from that genus in its 4-merous flowers and in its more numerous ovules, as well as in some other minor characters. It agrees with it not only in gross characters and general appearance, but especially in its 1-celled ovary, which is unusual in the family.

We are fortunate in having in this herbarium cotypes of the three species of *Dedea* proposed by Baillon, and the present species in facies is very similar to *D. minor* Baill., and *D. media* Baill. Distinguishing characters that at once strike the eye are the somewhat resinous younger parts of the Philippine plant and its older leaves distinctly glandular beneath with numerous, small, black glands, while all of Baillon's species are prominently lepidote, this character being absent in the form above described. In general appearance, however, *Curraniodendron dedeaeoides* is exceedingly similar to *Dedea minor* and *D. media;*

an examination of the pistillate flowers, however, shows sufficiently important differential characters to warrant the characterization of the Philippine plant as a distinct genus.

PITTOSPORACEÆ.

PITTOSPORUM Banks.

Pittosporum littorale sp. nov.

Arbor glabra usque ad 6 m alta; foliis anguste oblongo-obovatis, subcoriaceis, apice rotundatis, basi angustatis, decurrento-acuminatis vel acutis; fructibus aurantiacis, ovoideis, circiter 2 cm longis, 2-valvatis, apiculatis, in sicco rugosis; seminibus circiter 20, nigris.

A glabrous tree about 6 m high. Branches terete, light-gray, smooth. Leaves somewhat crowded toward the apices of the branchlets, subcoriaceous, narrowly oblong-obovate, 9 to 17 cm long, 3 to 5 cm wide, when dry somewhat shining, paler beneath, the apex rounded, broad, rarely somewhat acute, the base gradually narrowed, acute or decurrent-acuminate, the margins often somewhat recurved; nerves about 15 on each side of the midrib, not prominent; petioles 2 to 2.5 cm long. Flowers unknown. Fruiting racemes 2 to 3 cm long, in the upper axils. Fruits ovoid, about 2 cm long, 2-valved, valves ultimately recurved, orange-yellow when fresh, wrinkled when dry; the pericarp rather thick. Seeds about 20, black, shining.

MINDORO, *For. Bur. 9845 Merritt*, March, 1908, along the seashore. SIQUIJOR, *For. Bur. 16999 Everett*, December, 1907, rocky point at Liloan, locally known as *ticala*.

A species quite different from any of the other Philippine form, readily distinguishable by the shape of its leaves.

Pittosporum megacarpum sp. nov.

Arbor vel arbuscula glabra, usque ad 8 m alta, ramis pallide griseis, teretibus; foliis chartaceis, oblongo-ellipticis vel obovato-ellipticis, basi acutis, apice abrupte acuminatis; nervis utrinque 8 ad 10, subtus prominentibus; fructibus ovoideis, in sicco valde rugosis, 4 cm longis.

A shrub or tree 3 to 8 m high, glabrous throughout. Branches terete, light-gray. Leaves chartaceous, oblong-elliptic to obovate-elliptic, 10 to 18 cm long, 4 to 7 cm wide, shining when dry, the apex abruptly and sharply acuminate, the acumen 1 cm long or less, the base acute; nerves 8 to 10 on each side of the midrib, prominent beneath, impressed on the upper surface, anastomosing; petioles 1 to 2 cm long. Flowers unknown. Fruits ovoid, 2-valved, yellow, densely wrinkled when dry, about 4 cm long, shortly apiculate, the pericarp thick. Seeds many, irregular, about 6 mm long, black, minutely wrinkled when dry.

MASBATE, Bulo River, *For. Bur. 12557 Rosenbluth*, January, 1909. MINDORO, Balete River, *For. Bur. 5392 Merritt*, October, 1906.

A species with larger fruits than any other known Philippine form. Among our species most closely allied to *Pittosporum odoratum* Merr.

Pittosporum ramosii sp. nov.

Arbuscula vel arbor glabra, 3 ad 6 m alta; foliis elliptico-ovatis vel oblongo-ovatis, usque ad 6 cm longis, utrinque acuminatis, nervis tenuibus, vix distinctis; fructibus lateralibus, ovoideis, apiculatis, 1 ad 1.2 cm longis, 2-valvatis.

A shrub or tree 3 to 6 m high, glabrous. Branches terete, dark-gray or brownish. Leaves somewhat crowded at the apices of the branchlets, subcoriaceous, shining when dry, elliptic-ovate to oblong-ovate, 4 to 6 cm long, 2 to 2.5 cm wide, the apex sharply subcaudate-acuminate, the base decurrent-acuminate; nerves about 8 on each side of the midrib, slender, indistinct, the reticulations fine, close; petioles slender, about 1 cm long. Flowers unknown. Fruit from the branches below the leaves, axillary, solitary (the inflorescence apparently a short raceme), 2-valved, ovoid, smooth, yellow, apiculate, 1 to 1.2 cm long, the peduncles about 1 cm long; seeds few, 10 or less, black, shining, about 3 mm long.

LUZON, District of Lepanto, Balbalasan, *For. Bur. 5683 Klemme*, altitude 1,500 m: Province of Abra, Mount Bawagan, *Bur. Sci. 7211 Ramos* (type), February, 1909.

The fruits are very oily and with a strong odor of turpentine. Those that have been in the herbarium three years, when opened, were still wet with the aromatic oil characteristic of the genus. Similar in some respects to *P. pentandrum* Merr., but distinguished by its lateral inflorescence and by its leaves.

Pittosporum ramiflorum Zoll. ex Miq. Fl. Ind. Bat. 1 [2] (1858) 122.

Glyaspermum ramiflorum Zoll. & Mor. in Nat. Gen. Arch. Neerl. Ind. 2 (1845) 11.

Pittosporum clementis Merr. in Philip. Journ. Sci. 3 (1908) Bot. 137.

Additional study of the type material of *Pittosporum clementis* and comparison of the same with Javan material representing *Pittosporum ramiflorum* Zoll. has convinced me that the two species are identical and that *P. clementis* should be reduced to Zollinger's species. It is known from Java, Amboina, Celebes, Mindanao, and Negros (Canlaon Volcano, *Phil. Pl. 228 Merrill*, April, 1910). The name *Pittosporum ramiflorum* Zoll. is not listed in Index Kewensis or in any of the supplements of that work.

ROSACEÆ.

PRUNUS Linn.

Prunus junghuhnianus Miq. Fl. Ind. Bat. 1 [1] (1855) 366.

PALAWAN, Mount Victoria, *Bur. Sci. 731 Foxworthy*, March 24, 1906, in stream depressions, altitude about 250 m.

The specimen agrees well with Miquel's description, except that the racemes are nearly or quite glabrous, and also agrees perfectly in twig and leaf characters with sterile material received under the above name from Java.

New to the Philippines; previously definitely recorded only from Java.

RUTACEÆ.

CLAUSENA Burm.

Clausena worcesteri sp. nov.

Arbor vel arbuscula glabra; foliis alternis, foliolis 2–3-jugatis, ovatis, nitidis, apice abrupte obtuse acuminatis; paniculis terminalibus, pauci-

floris, corymbosis; floribus 5-meris, petalis basi acutis; fructibus junioribus manifeste stipitatis.

An erect shrub or small tree glabrous throughout. Branches slender, terete, shining, nearly black when dry. Leaves simply pinnate, less than 20 cm long, 2- or 3-jugate, the petiole and rachis terete, slender. Leaflets ovate, firmly chartaceous, shining 5 to 7 cm long, 2.5 to 4 cm wide, entire, the base acute or rounded, sometimes inequilateral, apex rather prominently acuminate, acumen blunt or retuse, prominently glandular-punctate; nerves about 5 on each side of the midrib, distant, anastomosing, the reticulations lax; petiolules 3 to 5 mm long. Panicles terminal, comparatively few-flowered, corymbose or subcorymbose, the branches few. Flowers 5-merous, white. Sepals broadly ovate, acute or obtuse, about 1 mm long. Petals 5, oblong-oblanceolate or oblanceolate, 5 to 5.5 mm long, 1.5 mm wide, the apex acute or slightly acuminate, narrowed below to the acute base, imbricate, somewhat coherent in the upper part. Stamens 10, the longer filaments 4 mm in length, abruptly narrowed from 1 mm below the anther, the alternating shorter filaments 3 mm long, abruptly narrowed just below the anther; anthers 1 mm long. Ovary oblong, cylindric, glabrous, about 2 mm long, 5-celled; styles thick, 2 mm long, slightly sulcate. Young fruits ovoid or ellipsoid, with a distinct, stout, 1 mm long stipe.

Luzon, Province of Cagayan, Apiao, near Tauit, *Bur. Sci. 10743 Worcester*, August, 1909.

This species is distinguished from all known Philippine forms by being quite glabrous. It is well characterized by its few leaflets, corymbose or subcorymbose, few-flowered panicles, its cylindric, glabrous ovary, and stipitate fruits. It is named in honor of its collector, Hon. Dean C. Worcester, Secretary of the Interior of the Philippine Government. When fresh the leaves are very aromatic.

Sterile material of what is manifestly the same species has been collected at the Mission River and on Mount Aluntang, both in the Province of Cagayan, *For. Bur. 17165, 17347 Curran*. Mr. Curran notes that the plant is used by the Negritos for ornamental purposes and for its odor.

Clausena mollis sp. nov.

Arbuscula circiter 5 m alta, omnibus partibus plus minus dense molliter pubescens; foliis 20 ad 30 cm longis, foliolis alternis vel subalternis, 5 ad 8 utrinque, integris, valde inaequilateralibus; paniculis terminalibus, anguste pyramidatis, floribus 5-meris, sessilibus vel subsessilibus, subglomeratis; fructibus globosis, albidis vel albido-viridibus, 1-spermis.

A slender shrub about 5 m high. Branches and branchlets terete, grayish or brownish, the younger ones often greenish, and with the petioles densely and softly pubescent with short spreading hairs. Leaves alternate, 20 to 30 cm long, the leaflets alternate 5 to 8 on each side of the pubescent rachis, chartaceous, somewhat shining, rather pale when dry, oblong-ovate, entire, 5 to 9 cm long, 2.5 to 3.5 cm wide, the base rounded or acute, strongly inequilateral, the apex shortly acuminate or nearly blunt, prominently glandular-punctate, both surfaces softly pubes-

cent, especially on the nerves, or the upper surface pubescent only on the midrib; nerves about 8 on each side of the midrib; petiolules densely pubescent, about 2 mm long. Panicles terminal, narrowly pyramidal, about 20 cm long, the rachis, branches and branchlets densely and softly pubescent with pale spreading hairs, the lower branches 7 cm long or less, the upper ones gradually shorter, spreading or ascending. Flowers 5-merous, sessile or shortly pedicelled, subglomerate on the ultimate branchlets, the buds globose or obovoid. Sepals broadly ovate, 1.2 mm long, free, densely pubescent outside. Petals elliptic or broadly elliptic-oblong, concave, about 4 mm long, 2.5 mm wide, acute at both ends, imbricate, with few, rather large glands, the back in the upper third slightly pubescent. Stamens 10, the filaments broad, abruptly narrowed just below the insertion of the anthers, about 1 mm long; anthers 2 mm long. Ovary ovoid or ellipsoid, about 1.5 mm long, glabrous, prominently 5-sulcate, 5-celled, each cell with two superimposed ovules; style 1 mm long and thick, 5-sulcate. Fruit globose, white or greenish-white, 6 to 7 mm in diameter, the pericarp rather thick, glandular-punctate, containing a single somewhat compressed seed about 5 mm in diameter, surrounded by a gelatinous pulp, with a strong odor and taste of pine pitch; cotyledons flat, plano-convex.

LUZON, District of Bontoc, near Bontoc, *For. Bur. 16530 Curran* (type), January 21, 1909, altitude above 1,000 m: Province of Benguet, Twin Peaks, *Elmer 6352*, May, 1904. *Bur. Sci. 7863 Ramos* from Cagayan Province, Luzon, with immature fruits, is possibly referable here, while a specimen from Zamboanga, Mindanao, *Hallier s. n.*, has much the facies of the present species, but has 4-merous flowers and 2-seeded fruits. *Clausena mollis* is well characterized by its soft, rather dense pubescence.

MELICOPE Forst.

Melicope densiflora sp. nov.

Arbuscula glabra 3 ad 5 m alta; foliis trifoliolatis, foliolis chartaceis vel submembranaceis, oblongo-obovatis, apice late breviter acuminatis, acuminibus retusis, nervis utrinque circiter 8; inflorescentiis axillaribus, petiolo aequalibus vel longioribus; floribus 4-meris, filamentis pilosis.

A shrub 3 to 5 m high, glabrous throughout. Branches terete, light-gray, the branchlets pale-reddish-brown, rather stout. Leaves 3-foliolate, opposite, their petioles 2 to 5 cm long; leaflets oblong-obovate to elliptic-obovate, chartaceous or submembranaceous, somewhat shining, 7 to 11 cm long, 3 to 5 cm wide, the apex shortly and broadly acuminate, the acumen retuse, narrowed from about the middle to the cuneate base, the terminal leaflet equilateral, the lateral ones somewhat inequilateral; petioles 3 to 10 mm long; lateral nerves about 8 on each side of the midrib, anastomosing, the secondary ones often nearly as prominent. Inflorescence axillary, solitary, 5 to 6 cm long, narrowly pyramidal, the lower branches often 3.5 cm in length, rather densely flowered. Stamin-

ate flowers somewhat fascicled on the ultimate branchlets, their pedicels 1.5 to 2 mm long, glabrous. Sepals 4, ovate, acute, 0.8 mm long. Petals 4, oblong, 3 mm long, 1 to 1.3 mm wide, thin, obtuse, the apex appendiculate inside. Stamens 8, the filaments rather densely clothed with spreading hairs in the lower half, the longer four 3 mm, the shorter four 2 mm in length; anthers 0.8 mm long. Pistillate flowers similar to the staminate ones, the staminodes slightly pubescent. Ovary ovoid, glabrous, 1.2 mm long, glabrous, deeply longitudinally 4-sulcate, 4-celled, each cell 2-ovuled; style very short (less than 0.5 mm); stigma radiately 4-lobed.

BATANES ISLANDS, Batan, Santo Domingo de Basco, *Bur. Sci. 3235 Mearns, Bur. Sci. 3603 Fénix, Bur. Sci. 10682 McGregor,* locally known as *idacacayo:* Sabtan, *Bur. Sci. 10676 McGregor.*

Some of these specimens were previously referred by me[1] to *Melicope luzonensis* Engl., but they are sufficiently distinct to warrant description as a separate species. *M. densiflora* is distinguished from *M. luzonensis* Engl. by its differently shaped and fewer nerved leaves, its dense inflorescence, and especially by its pilose filaments and staminodes. *Bur. Sci. 3215 Mearns* is possibly referable here, but its filaments seem to be quite glabrous.

EVODIA Forst.

Evodia acuminata sp. nov.

Arbor inflorescentiis exceptis glabra, circiter 10 m alta; foliis trifoliolatis vel aliis unifoliatis, foliolis subcoriaceis, oblongo-obovatis, nitidis, basi acuminatis, apice abrupte subcaudato-acuminatis, acuminibus circiter 1 cm longis; inflorescentiis axillaribus, pedunculatis, 6 ad 8 cm longis; floribus 4-meris, sepalis petalisque glanduloso-punctatis.

A tree about 10 m high, glabrous except the inflorescence, the ultimate branchlets, petioles and under surfaces of the leaves distinctly glandular-punctate, the branches terete, smooth, pale-brownish, the ultimate branchlets somewhat compressed. Leaves opposite, the petioles 6 to 9 cm long, or those of unifoliolate leaves only about 2 cm long; leaflets usually three, sometimes solitary, oblong-obovate, subcoriaceous, shining, paler beneath, 9 to 14 cm long, 4 to 6 cm wide, entire, the apex broad, abruptly subcaudate-acuminate, the acumen about 1 cm long, the base decurrent-acuminate, the lateral leaflets somewhat inequilateral; petiolules 0.5 to 1.5 cm long; primary lateral nerves 8 or 9 on each side of the midrib, distant, irregular, anastomosing, the secondary ones often nearly as prominent. Cymes axillary, peduncled, the peduncles 3.5 to 5 cm long, solitary, glabrous, each cyme about 3 cm wide, the branches and branchlets cinerous-puberulent. Flowers white, somewhat crowded, their pedicels 3 to 4 mm long, puberulent, each subtended by two or three, ovate, 1 mm long bracteoles. Sepals 4, orbicular, imbricate, about 3 mm in diameter, rounded, glandular-punctate, margins minutely ciliate.

[1] *This Journal* **3** (1908) *Botany* 411.

Petals 4, oblong or oblong-ovate, about 5 mm long, 2.2 to 2.5 mm wide, apex acute, minutely appendaged inside. Stamens 4, the filaments stout, 2 mm long, bearing imperfect, oblong, 1 mm long anthers. Ovary pubescent, deeply 4-lobed, 4-celled, each cell 2-ovuled; style stout, 3 mm long, pubescent; stigma subcapitate. Staminate flowers and fruits unknown.

LUZON, Province of Sorsogon, Sorsogon, *For. Bur. 10520 Curran*, June 10, 1908, near abaca (*Musa textilis*) plantations, altitude about 200 m.

A species well characterized by its abruptly acuminate leaflets, 3-foliolate and 1-foliolate leaves occurring on the same branches, its rather small, rather long-peduncled cymes, and comparatively large flowers. It is apparently as closely allied to *Evodia glabra* Bl., as to any other species, but is quite different from that.

MELIACEÆ.

AGLAIA Lour.

Aglaia lanceolata sp. nov. § *Euaglaia*.

Arbor parva vel arbuscula, ramulis foliis junioribus inflorescentiisque densissime brunneo-lepidotis; foliis alternis, imparipinnatis, foliolis 7 ad 11, anguste lanceolatis, membranaceis vel chartaceis, apice sensim acuminatis, basi inaequilateralibus, acutis vel acuminatis, in sicco pallidis, nitidis, utrinque praesertim subtus plus minus brunneo-lepidotis; paniculis axillaribus terminalibusque, foliis subaequalibus vel brevioribus, diffusis, multifloris; floribus minutis, 5-meris, racemose dispositis, breviter pedicellatis, tubo stamineo libero.

A small tree or shrub (2 m high according to the collector), all parts more or less brown-lepidote, the branchlets, inflorescence and young leaves densely so. Branches terete, gray or brownish, ultimately glabrous. Leaves alternate, 20 to 30 cm long, the rachis at first lepidote, ultimately glabrous or nearly so. Leaflets 7 to 11, alternate, or the upper ones opposite, narrowly lanceolate, 8 to 12 cm long, 1.5 to 2 cm wide, rather pale and somewhat shining when dry, the young ones densely brown-lepidote on both surfaces, the mature ones ultimately nearly glabrous, the apex narrowly and gradually acuminate, the base inequilateral, acute or acuminate; nerves 15 to 20 on each side of the midrib, indistinct; petiolules about 2 mm long. Panicles axillary and terminal, about 15 cm long, pyramidal, diffuse, branched from the base, all parts densely brown-lepidote. Flowers 5-merous, small, racemosely disposed on the ultimate branchlets, very numerous, their pedicels about 1 mm long. Calyx-lobes lepidote, rounded, 0.5 mm long. Petals glabrous, orbicular or orbicular-elliptic, about 1 mm long. Staminal-tube globose, glabrous, free from the petals, crenate at the apex; stamens 5, inserted at about the middle of the tube, included.

LUZON, Province of Nueva Vizcaya, Amucucan, near Bayombong, *Bur. Sci. 8141 Ramos*, May 13, 1909, in forests along streams.

A species manifestly allied to *Aglaia angustifolia* (Miq.) C. DC., but abundantly distinct, well characterized by its narrowly lanceolate leaves.

DYSOXYLUM Blume.

Dysoxylum venosum sp. nov. § *Eudysoxylum.*

Arbor, partibus junioribus subtus foliis inflorescentiisque molliter puberulis; foliis alternis, imparipinnatis, foliolis 11, oblongis vel elliptico-oblongis, acuminatis, nitidis, supra glabris, in sicco pallidis, nervis utrinque circiter 10, supra impressis, subtus prominentibus; inflorescentiis axillaribus, brevibus, spiciformibus; floribus 4-meris, tubo stamineo libero, ovario pubescente.

A tree of medium size, the branches terete, grayish, glabrous, the branchlets, inflorescence, rachis and under surface of the leaflets softly pale-olivaceous-puberulent. Leaves about 45 cm long, alternate; leaflets 11, the lower ones alternate, the upper opposite, oblong or elliptic-oblong, 10 to 17 cm long, 4.5 to 7 cm wide, rather pale when dry, shining, the upper surface glabrous, or the midrib often puberulent, apex acuminate, base acute; nerves about 10 on each side of the midrib, impressed above, beneath prominent, anastomosing, the reticulations lax, obscure; petiolules puberulent, about 5 mm long. Inflorescences in the upper axils, and in the axils of fallen leaves, solitary, spiciform, unbranched, 4 cm long or less, the pedicels very short. Flower-buds globose, 4 mm in diameter, the calyx shortly 4-toothed, puberulent outside, the teeth triangular-ovate, 1 mm long or less. Petals 4, densely gray-puberulent outside, oblong or oblong-ovate, 4 mm long. Staminal-tube cylindric, free, glabrous, 3 mm long, minutely crenate. Anthers 8, included. Disk tubular, 1 mm long, obscurely denticulate, glabrous outside, pubescent within. Ovary ovoid, densely pubescent, 4-celled; style, including the stigma, about 2 mm long.

LUZON, Province of Cagayan, Mount Cura, *For. Bur. 16839 Curran,* March, 1909, altitude about 200 m.

A species much resembling *D. turczaninowii* C. DC., but distinguished by its very strongly veined leaves, most parts densely puberulent, and many other characters.

Dysoxylum biflorum sp. nov. § *Eudysoxylum.*

Arbor glabra vel subglabra, partibus junioribus exceptis; foliis alternis, abrupte pinnatis, 3-jugatis, foliolis elliptico-ovatis, subcaudato-acuminatis, basi acuminatis, subtus in venarum axillis glandulosis barbatisque; inflorescentiis axillaribus, depauperato-paniculatis, pedunculis bifloris; floribus longe pedicellatis, 4-meris; calycibus pyriformibus, breviter obscure crenatis; petalis 4, glabris, tubo stamineo libero; ovario glabro vel subglabro, 4-loculare.

A tree, nearly glabrous except the innovations which are somewhat pubescent. Branches terete, lenticellate, slender, brown. Leaves alternate, 20 cm long, equally pinnate, 3-jugate; leaflets opposite, elliptic-ovate to oblong-ovate, chartaceous or somewhat coriaceous, glabrous and shining on the upper surface, 6 to 10 cm long, 2.5 to 3.5 cm wide, the

apex rather abruptly subcaudate-acuminate, acumen about 1 cm long, blunt, base acuminate; nerves about 8 on each side of the midrib, prominent beneath, impressed above, anastomosing, the reticulations lax, obscure, with a barbate gland in the axil of each nerve where it leaves the midrib; petiolules 3 to 5 mm long. Inflorescences few, axillary, each consisting of a 5 to 6 cm long peduncle, bearing at its apex two long-pedicelled flowers, each pedicel subtended by a small bract about 2 mm long, and each calyx subtended by a smaller, but similar bracteole; pedicels 1 cm long. Calyx pear-shaped, 4 mm long, 3.5 mm in diameter above, the mouth with four broad, obscure, rounded teeth. Petals 4, in bud elliptic, 3 mm long. Staminal-tube free, about 2 mm long, cylindric, denticulate; stamens 8, the anthers 1 mm long, included. Disk tubular, 1 mm long, free. Ovary ovoid, 4-celled, each cell 1-ovuled, glabrous or with few scattered hairs, including the short style 2 mm in length.

LUZON, Province of Isabela, Cabagan River, *For. Bur. 18563 Alvarez*, April 22, 1909, altitude about 100 m.

A species well characterized by its two-flowered inflorescences.

MALPIGHIACEÆ.

HIPTAGE Gaertn.

Leaves not gradually narrowed upward, obtuse or rounded; uniformly and distinctly reticulate on both surfaces; flowers small..... 1. *H. reticulata*

Leaves more or less gradually narrowed upward to the acuminate or acute apex.

Leaves pubescent, often densely so.

Carpels small, less than 1.5 cm long, including the wings; leaves less than 2.5 cm in width.

An erect tree or shrub; leaves glabrous on the upper surface, densely pubescent with pale hairs beneath; racemes many flowered.

2. *H. pubescens*

Scandent; leaves pubescent on both surfaces; racemes few-flowered.

3. *H. curranii*

Carpels large, including the wings reaching 4.5 cm in length; leaves 3.5 to 5 cm wide..... 4. *H. tetraptera*

Leaves glabrous.

Carpels large, including the wings reaching a length of 8 cm.

5. *H. macroptera*

Carpels small, including the wings not exceeding 2.5 cm in length.

Leaves broad, rather abruptly acuminate, the lateral nerves 4 or 5; central wing of the carpels 1 to 1.4 cm broad..... 6. *H. cumingii*

Leaves relatively narrow, gradually narrowed upward, the lateral nerves 6 or 7; central wing of the carpels less than 1 cm broad.

Leaves ample, usually exceeding 10 cm in length..... 7. *H. javanica*

Leaves small, 6 cm long or less..... 8. *H. luzonica*

1. **Hiptage reticulata** sp. nov.

Frutex scandens (?); foliis elliptico-oblongis, coriaceis, utrinque glabris, nitidis, reticulatis, obtusis vel rotundatis, nervis utrinque circiter 8; racemis circiter 8 cm longis, leviter pubescentibus, compositis; floribus vix 1 cm diametro.

An erect or scandent shrub or a tree. Leaves elliptic-oblong, coriaceous, glabrous, shining, about 6 cm long, 2.5 cm wide, abruptly narrowed at both base and apex which are obtuse or rounded; nerves about 8 on each side of the midrib, anastomosing, the reticulations rather close, distinct on both surfaces. Racemes compound, about 8 cm long, slightly pubescent, the pedicels about 10 mm long, scattered along the rachis, each subtended by a 1 mm long bracteole, and bearing at about the middle an additional bracteole subtending a sessile or shortly pedicelled bud. Calyx-gland very prominent, 1.5 to 2 mm long. Sepals 1.5 to 2 mm long, obtuse. Petals 3 to 4 mm long, rounded.

LUZON, Province of Zambales, *Vidal 2243* in Herb. Kew.

This form has as yet not been rediscovered in the Philippines, and is described from the single specimen preserved in the Kew herbarium. It is well characterized by its elliptic-oblong, glabrous, shining, reticulate, blunt leaves, and by its comparatively small flowers.

2. **Hiptage pubescens** sp. nov.

Arbor parva usque ad 5 m alta, ramulis, subtus foliis, inflorescentiisque dense pallide adpresse sericeo-pubescentibus; foliis coriaceis, elliptico-oblongis vel oblongo-lanceolatis, acuminatis, basi rotundatis vel acutis; racemis axillaribus foliis subaequalibus vel longioribus; carpellis vix 1.5 cm longis.

A small tree 4 to 5 m high (9 m according to Ramos). Branches brown or gray, terete, lenticellate, glabrous, the young branchlets densely and pale-silky-pubescent. Leaves opposite, coriaceous, elliptic-oblong to oblong-lanceolate, 5 to 8 cm long, 1.5 to 2.5 cm wide, glabrous and shining above, on the lower surface densely covered with pale, appressed, silky hairs; the base rounded or sometimes somewhat acute, the apex distinctly, often strongly and gradually acuminate; nerves 7 or 8 on each side of the midrib, not prominent, obscurely anastomosing, obscured on the lower surface by the pubescence, but the hairs sometimes rubbing off, the veins then appearing brown in contrast to the pale surface of the leaf; petioles 2 to 3 mm long, pubescent. Racemes axillary, solitary, about as long as the leaves, sometimes crowded in the upper axils and simulating a terminal inflorescence, many-flowered, densely silky-pubescent with pale appressed hairs, the pedicels 5 to 7 mm long. Flowers yellow or red, about 1 cm in diameter when open. Sepals obtuse, the gland prominent. Petals 5 to 6 mm long, obtuse, pubescent. Fruit of two carpels, somewhat pubescent, the central wing of each carpel 10 to 12 mm long, about 5 mm wide, rounded or obtuse, the two lateral ones similar but less than one-half as long, and truncate or rounded.

LUZON, Province of Abra, Mount Paraga, *Bur. Sci. 7257 Ramos*, February, 1909 (type): Lepanto-Bontoc, *For. Bur. 11263 Klemme*, February, 1908, altitude about 1,200 m: Province of Ilocos Norte, Mount Piao, *For. Bur. 13979 Merritt & Darling*, altitude about 1,000 m.

This species is readily recognizable by its comparatively small leaves and small

fruits, but especially by the dense, pale, appressed, silky pubescence on the inflorescence, branchlets and lower surfaces of the leaves. It is remarkable in the genus in that it is erect and arborescent, not scandent. The trunk-diameter is given by the various collectors as from 8 to 30 cm.

Var. **lanceolata** var. nov.

A typo differt foliis angustioribus, lanceolatis, circiter 1 cm latis.

LUZON, Province of Ilocos Norte, Badoc, *For. Bur. 13955 Merritt & Darling,* altitude about 65 m, locally known as *pangardisin;* near Vintar, altitude 700 m, *For. Bur. 13943 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 5632 Klemme.*

In general appearance, pubescence, flowers, etc., quite the same as the species, differing only in its narrower and lanceolate leaves. The fruits are unknown.

3. **Hiptage curranii** sp. nov.

Frutex scandens, omnibus partibus pubescens; foliis coriaceis, elliptico-oblongis vel late oblongo-lanceolatis, acuminatis, nervis utrinque circiter 5; racemis axillaribus, brevibus, paucifloris; carpellis circiter 1 cm longis.

A scandent shrub, reaching a height of 4 m, in vegetative characters similar to *Hiptage pubescens* Merr. Branches terete, slender, becoming glabrous, dark-colored, often nearly black, scarcely lenticellate, the branchlets densely pale-pubescent. Leaves opposite, oblong-elliptic to broadly oblong-lanceolate, coriaceous, 4 to 8 cm long, 1.5 to 2.5 cm wide, the base acute, rarely obtuse, the apex gradually and distinctly acuminate, the upper surface covered with short, yellowish-brown hairs, the lower surface very densely pubescent with pale appressed hairs; nerves about 5 on each side of the midrib, curved-ascending, anastomosing, not prominent; petioles densely pubescent, 3 to 4 mm long. Flowers unknown. Racemes in fruit 2.5 cm long or less, densely pubescent with pale hairs, few-flowered, often only three flowers in a raceme, or reduced to a single flower. Fruit of two carpels, more or less pubescent, the central wing of each carpel rather thin, 1 cm long, about 5 mm wide, the lateral ones similar but less than one-half as long.

LUZON, Province of Zambales, Baquilis River, *For. Bur. 6951 Curran,* May 9, 1907, in the dry river bed.

Similar in most respects to *H. pubescens,* differing in being scandent instead of erect, in its short, few-flowered racemes, and by its leaves being pubescent on both surfaces, mostly acute at the base, and with fewer lateral nerves.

4. **Hiptage tetraptera** sp. nov.

Frutex suberectus, vix scandens, omnibus partibus plus minus adpresse pubescens; foliis coriaceis, ovatis vel anguste ovatis, obscure late acuminatis, nervis utrinque 4 vel 5; racemis axillaribus, solitariis, simplicibus; carpellis 1 vel 2, alato-cristatis, crista 1 ad 1.5 cm longa.

A suberect shrub about 2 m high, scarcely scandent. Branches terete, pale, densely appressed-pubescent with short, pale hairs. Leaves opposite,

coriaceous, 6 to 8 cm long, 3.5 to 5 cm wide, the upper surface somewhat appressed-pubescent, especially on the nerves, later becoming subglabrous, the lower surface rather densely pubescent with short, pale, appressed hairs, the base rounded or subacute, the apex obscurely and broadly acuminate; nerves 4 or 5 on each side of the midrib, distinct, curved-ascending, the reticulations obscure; petioles pubescent, the apical glands prominent. Racemes axillary, solitary, 8 to 10 cm long, pubescent, the pedicels 1 to 2 cm long. Sepals pubescent, obtuse. Petals unknown. Carpels one or two, somewhat appressed-pubescent, about 8 mm long and wide, the crest prolonged into a narrow, oblong or oblong-lanceolate wing, 1 to 1.5 cm long and 3 to 4 mm wide; central wing 3.5 to 4.5 cm long, about 1.5 cm wide, rounded, the lateral ones similar and about one-half as large.

PALAWAN, Separation Point, *Merrill 1791*, February 18, 1903.

A species recognizable by its pubescent leaves, and especially by its carpel-crests being prolonged into a manifest wing, making the carpels appear as though they were four-winged, whence the specific name.

5. Hiptage macroptera sp. nov.

Frutex scandens, inflorescentiis exceptis glaber vel subglaber; foliis elliptico-oblongis vel ovato-ellipticis, acuminatis, nervis utrinque circiter 6; racemis densis, axillaribus; carpellis 1 vel 2, obscure late carinatis, vix cristatis, ala media usque ad 7 cm longa.

A scandent shrub, glabrous except the inflorescence. Branches terete, reddish-brown or grayish, somewhat lenticellate. Leaves chartaceous or subcoriaceous, elliptic-oblong to ovate-elliptic, 8 to 12 cm long, 3 to 5.5 cm wide, glabrous, shining, the base rounded, rarely subacute, the apex prominently and usually abruptly acuminate; nerves about 6 on each side of the midrib, prominent, curved upward, obscurely anastomosing, the reticulations not prominent; petioles about 7 mm long, the leaf-base with usually two distinct glands at the junction with the petiole. Racemes axillary, solitary, densely rather many-flowered, pubescent, in anthesis 4 to 5 cm long, longer in fruit. Flowers pinkish-white, their pedicels 10 to 12 mm long, longer in fruit. Sepals elliptic, rounded, about 4 mm long, 2.5 mm wide, pubescent. Petals 10 to 12 mm long, prominently fimbriate. Carpels one or two, slightly pubescent, with a broad low ridge along the top but scarcely crested, the central wing 6 to 7 cm long, usually about 1.5 cm wide, somewhat narrowed at both ends, apex obtuse, the lateral wings similar and about one-half as long.

MINDANAO, Lake Lanao, *Mrs. Clemens s. n.*, May, 1907, the specimen in fruit (type), and also *no. 1056*, same date, in flower.

This species grows in thickets and forests along the margin of the lake, the young leaves and rather prominent fruits being red in color. It is manifestly allied to *H. benghalensis* (L.) O. Ktze., differing especially in its much larger wings.

6. **Hiptage cumingii** sp. nov.

Hiptage madablota Vid. Phan. Cum. Philip. (1885) 99, non Gaertn.

Scandens, inflorescentiis exceptis glabra vel subglabra; foliis coriaceis, ovato-ellipticis vel oblongo-ovatis, usque ad 9 cm longis, basi acutis vel rotundatis, apice acuminatis, nervis utrinque 4 vel 5; racemis simplicibus, foliis subaequilongis; carpellis 2 vel 3, vix vel obscure cristatis, ala media 1.5 ad 2 cm longa.

A scandent shrub, glabrous or nearly glabrous except the inflorescence. Branches terete, lenticellate, rather slender, usually reddish-brown, the branchlets more or less pubescent soon becoming glabrous. Leaves coriaceous, ovate-elliptic to oblong-ovate, 5.5 to 9 cm long, 3 to 5 cm wide, shining above, the base acute or rounded, the apex distinctly and often abruptly acuminate; lateral nerves 4 or 5 on each side of the midrib, anastomosing, the reticulations not distinct; petioles 5 to 7 mm long. Racemes axillary, solitary, mostly in the upper axils and simulating a terminal inflorescence, 5 to 8 cm long, pubescent, the flowers numerous, the pedicels about 1 cm long, somewhat elongated in fruit, the bracteoles near the middle about 2 mm in length. Sepals oblong, rounded, about 3 mm long. Petals 6 to 7 mm long, pubescent. Carpels 2 or 3, somewhat appressed-pubescent, not or very obscurely crested, the central wing broadly oblong-elliptic or obovate-elliptic, 1.5 to 2 cm long, often nearly 1.4 cm wide, the lateral ones about one-half as long.

LUZON, Province of Pangasinan, *Cuming 971* (type).

I am also disposed to refer here *For. Bur. 6732 Merritt*, from near Pinamalayan, Mindoro, which differs from Cuming's specimen in having the leaves somewhat pubescent beneath, and in its very slightly smaller fruits, and *Bur. Sci. 753 Foxworthy* from Mount Victoria, Palawan, the latter very closely matching the type.

Hiptage cumingii is manifestly allied to *H. benghalensis* (L.) O. Ktze. (*H. madablota* Gaertn.), but differs especially in its smaller, fewer-nerved leaves, smaller flowers, its crestless carpels, and much smaller wings.

7. **Hiptage javanica** Bl. Bijdr. (1825) 224; Miq. Fl. Ind. Bat. 1[2] (1858) 586; Hochr. Pl. Bogor. Exsicc. no. 32.

MINDANAO, District of Cotabato, near Fort Reina Regente, *For. Bur. 3944 Hutchinson.*

This specimen closely matches a very full series of specimens representing Blume's species, received from the Botanic Garden at Buitenzorg, differing in having some of the leaves slightly wider. The species has not previously been recorded otherwise than from Java.

There are in this herbarium four specimens, all with flowers, from the Province of Rizal, Luzon, that previously have been referred to *H. madablota* Gaertn., and the duplicates distributed under that name. This material is manifestly not specifically the same as Gaertner's species, and may possibly be referable to *H. javanica* Bl., although there are some manifest differences in vegetative characters, especially in the much more obscure reticulations. Otherwise the specimens very closely resemble *H. javanica* Bl., but in the absence of fruiting material, they are not at present definitely referred to that species. The specimens are

Merrill 1704, 5046, and *For. Bur. 420, 2660 Ahern's collector.* *H. madablota* Vid. Sinopsis Atlas (1883) *t. 22, f. A.* (non Gaertn.) manifestly represents the same form as the four specimens above mentioned.

8. **Hiptage luzonica** Merr. in Govt. Lab. Publ. (Philip.) **35** (1905) 33, Philip. Journ. Sci. 1 (1906) Suppl. 74.

LUZON, Province of Bataan, Mount Mariveles, *Whitford 1148.*

This species is known only from the original collection, and the type is possibly only a dwarfed state of the Rizal form discussed above under *H. javanica* Bl. A full series of specimens will be necessary definitely to settle this point. So far as our material goes, *H. luzonica* is distinguishable by its small leaves.

HIPTAGE MADABLOTA Gaertn. (=*H. benghalensis* (L.) O. Ktze.) has been credited to the Archipelago by various authors, but I have seen no Philippine material that I consider to be referable to that species. The plant so figured by Vidal in his "Sinopsis Atlas" unquestionably represents the Luzon form discussed under *H. javanica,* while the plant so identified by him in his "Phanerogamae Cumingianae Philippinarum" has above been made the type of a new species, *H. cumingii.* The form so credited to the Philippines by F.-Villar in the "Novissima Appendix" is doubtless, for most part, the same as that figured by Vidal, as the specimens F.-Villar examined came from the Province of Manila (=Rizal).

Triopteris jamaicensis Blanco Fl. Filip. (1837) 379, ed. 2 (1845) 207, non Linn., is manifestly *Hiptage,* although not *H. madablota* Gaertn., where it was referred by F.-Villar. It is probably the form figured by Vidal, mentioned above, as this is apparently the only species of the genus that is at all common in the region from which Blanco secured most of his material.

EUPHORBIACEÆ.

ACALYPHA Linn.

Acalypha grandibracteata sp. nov.

Species A. stipulaceae valde affinis, differt foliis latioribus, basi cordatis vel subcordatis, bracteis multo majoribus, usque ad 1 ad 2 cm longis.

A shrub or small tree, slightly puberulent or pubescent. Branches pale or reddish-brown, puberulent, sometimes stout and thickened. Leaves broadly ovate to oblong-ovate, chartaceous or submembranaceous, 12 to 20 cm long, 7 to 15 cm wide, with minute, scattered, white pustules on both surfaces, and with very few, scattered, long hairs, the margins regularly and rather finely crenate-serrate, the apex acuminate, the base broad and cordate or subcordate, palmately 7- or 9-nerved from the base; petioles 20 cm in length or less; stipules linear-lanceolate, long-acuminate, 1.5 to 2 cm long. Staminate and pistillate spikes on the same plant, or apparently more often on separate plants, the staminate ones dense, cylindric, pubescent, often 20 cm long, about 3 mm in diameter, the flowers 3- or 4-merous. Pistillate spikes peduncled, stout, 20 cm long or less, about 2 cm in diameter, the bracts broadly ovate, acuminate, toothed, about 1 cm long, the lowermost ones sometimes 2 cm in length, more or less appressed-hirsute on the back, the pistillate flowers solitary in the axil of each bract. Ovary hirsute; styles nearly 3 mm long, split

into several, filiform, elongated lobes. Capsule about 2 mm long, hirsute, the seeds elliptic-oblong, 1.2 mm long, smooth and glabrous.

BATANES ISLANDS, Batan, Santo Domingo de Basco, *Bur. Sci. 3607 Fénix* (type), with staminate and pistillate spikes on the same branch, *Bur. Sci. 3206 Mearns*, May, 1907, with pistillate spikes. A narrower-leaved form is apparently represented by *Bur. Sci. 4084 Fénix*, from Camiguin Island, Babuyanes, locally known as *ajas*.

These specimens were previously referred by me to *Acalypha stipulacea* Klotz., which they closely resemble in many respects, differing especially in the points noted in the diagnosis above.

Acalypha australis Linn. Sp. Pl. (1753) 1004; Hemsl. in Journ. Linn. Soc. Bot. **26** (1894) 437.

LUZON, Province of Cagayan, *Bur. Sci. 7800, 7869 Ramos*, April, 1909.

Not previously reported from the Philippines; Manchuria and Japan to southern China.

ALCHORNEA Muell.-Arg.

Alchornea sicca (Blanco) comb. nov.

Excoecaria sicca Blanco Fl. Filip. (1837) 787, ed. 2 (1845) 542, ed. 3, **3**:94; Naves l. c. ed. 3, *pl. 307*.

Stipellaria parviflora Benth. in Hook. Journ. Bot. & Kew. Miscel. **6** (1854) 4.

Alchornea parviflora Muell.-Arg. in Linnaea **34** (1865) 168, DC. Prodr. **15**^{2}:902; Vid. Phan. Cuming. Philip. (1885) 144, Rev. Pl. Vasc. Filip. (1886) 244; F.-Vill. Nov. App. (1880) 194.

Alchornea mollis F.-Vill. l. c., non Muell.-Arg.

"*Acalypha tiliaefolia* Muell.-Arg."; Vid. Rev. Pl. Vasc. Filip. (1886) 244.

LUZON, Province of Rizal, *Bur. Sci. 3334, 5220 Ramos, Vidal 592, 1710* (herb. Kew.), *Loher 4667:* Province of Laguna, *Elmer:* Province of Pampanga, *For. Bur. 18314 Curran.* NEGROS, *Cuming 1800.*

Blanco's description unmistakably applies to this species, and his name being the earliest one is here adopted. Cuming's specimen was from Negros according to his own list of localities. The enumeration of "*Acalypha tiliaefolia* Muell.-Arg." by Vidal seems to have been a slip for "*Alchornea tiliaefolia* Muell.-Arg." There is no such species as "*Acalypha tiliaefolia* Muell.-Arg."

DIMORPHOCALYX Thwaites.

Dimorphocalyx luzoniensis sp. nov.

Arbor glabra, dioica, circiter 12 m alta; foliis alternis, chartaceis, elliptico-ovatis, acuminatis, integris vel distanter obscureque denticulatis, nervis utrinque 10 ad 12; inflorescentiis axillaribus, racemoso-cymosis, quam folia brevioribus; floribus masculinis circiter 8 mm longis, staminibus 15, filamentis in columna connatis sed exterioribus elongatis, fere liberis; floribus femineis albis, 2.5 cm diametro, sepalis liberis, accrescentibus.

A glabrous dioecious tree about 12 m high. Branches slender, terete, grayish-brown, somewhat lenticellate. Leaves alternate, elliptic-ovate, chartaceous, grayish or brownish and somewhat shining when dry, 10 to 15 cm long, 4 to 7 cm wide, the base rounded or somewhat acute, the apex sharply acuminate, the margins entire or distantly denticulate with

very small subglandular teeth; petioles 1 to 3 cm long; lateral nerves 10 to 12 on each side of the midrib, rather distinct, the reticulations lax. Inflorescence axillary, shorter than the leaves, of racemosely arranged cymes, the staminate and pistillate similar. Pistillate flowers white, ample, their pedicels 7 to 10 mm long. Calyx of five free sepals, imbricate, elliptic-ovate, rounded, often slightly retuse, glabrous, 1.2 to 2 cm long, 6 to 12 mm wide, reticulate, apparently persistent. Petals 5, imbricate, broadly elliptic-ovate, about 10 mm long, 8 mm wide, apex rounded, not reticulate or nerved. Disk small. Staminodes none. Ovary glabrous, longitudinally 3-sulcate, the lobes rounded, 3-celled, each cell with a single ovule; styles 3, free, about 5 mm long, each cleft half way to the base into two divergent arms. Staminate flowers smaller than the pistillate ones. Calyx 5 to 6 mm long, cleft into five elliptic-oblong, imbricate, obtuse lobes about 3 mm long and 2 to 2.5 mm wide. Petals 5, free, imbricate, oblong-elliptic, rounded, 7 to 8 mm long, 4 mm wide. Disk-glands 5, prominent, white, 1.5 to 2 mm long. Stamens 15, the filaments all more or less united into a column, the interior ones very short, the outer five longer and nearly free, these outer ones about 3.5 mm long, the free portions of the inner ones progressively shorter; anthers introrse. Rudimentary ovary none.

LUZON, Province of Laguna, Los Baños, *For. Bur. 11907 Tamesis*, January 22, 1910, pistillate flowers; same locality, *Bautista s. n.*, February 11, 1904, staminate flowers. Borders of clearings, altitude about 100 m.

AQUIFOLIACEÆ.

ILEX Linn.

Ilex foxworthyi sp. nov. § *Thyrsoprinus, Indico-Malaicae.*

Arbor inflorescentiis exceptis glabra, circiter 8 m alta; foliis ovatis vel elliptico-ovatis, coriaceis, usque ad 9 cm longis, nitidis, subtus obscure minutissime dense puncticulatis et punctis majoribus sparsis intermixtis, nervis utrinque circiter 7; racemis axillaribus, solitariis, in alabastro circiter 3 cm longis, puberulis, floribus femineis 5- vel 6-meris.

A tree about 8 m high, glabrous except the inflorescence. Branches gray, terete, wrinkled when dry, not lenticellate. Leaves ovate to elliptic-ovate, coriaceous, shining, brown or olivaceous when dry, and slightly paler beneath, the margins recurved, entire, 4 to 9 cm long, 2.5 to 5 cm wide, the lower surface very minutely, obscurely, and densely puncticulate, and with scattered larger points, the latter not prominent, the apex shortly blunt-acuminate, base rather broad, acute; nerves about 7 on each side of the midrib, not prominent, slender, obscurely anastomosing, the reticulations lax, about as distinct on the upper surface as on the lower; petioles 1 cm long or somewhat less on the smaller leaves. Pistillate flowers racemose, the racemes axillary, solitary, simple, in bud 3 cm long or less, puberulent, some flowers also occurring solitary

or in pairs on the growing branchlets, the pedicels puberulent, 3 to 4 mm long, each subtended by a triangular-ovate, acute or acuminate, puberulent, 1 mm long bracteole. Pistillate flowers (in bud), 5- or 6-merous, the buds globose, the calyx-segments elliptic, rounded, puberulent, about 2 mm long, 1.2 mm wide, imbricate. Corolla (immature) nearly 3 mm long. Staminodes 1 mm long, bearing imperfect anthers. Ovary not compressed, subglobose, 5- or 6-celled, the stigma nearly as broad as the ovary, somewhat sulcate. Staminate flowers and fruits unknown.

LUZON, Province of Tayabas, Mount Banajao, *Bur. Sci. 2416 Foxworthy*, March 24, 1907, altitude about 1,450 m.

This species is apparently allied to *Ilex malaccensis* Loesener, of the Malay Peninsula and Borneo, but its leaves with the lateral nerves distinctly visible on the upper surface, acute at the base, and its 5- or 6-celled ovaries are apparently sufficiently distinctive to warrant the description of the present form as new.

It is also allied to *Ilex halconensis* Merr., but is distinguished at once by its puberulent racemes.

ICACINACEÆ.

URANDRA Thwaites.

Urandra hallieri sp. nov.

Arbor glabra vel subglabra, circiter 20 m alta; foliis alternis, coriaceis, oblongo-ellipticis vel oblongis, breviter obtuse acuminatis, in sicco pallidis, nitidis, nervis utrinque circiter 15, tenuibus, obscuris; cymis pedunculatis, axillaribus, solitariis, quam petiolus paullo longioribus, floribus 5-meris, calyce truncato, connectivo antherarum longe barbato.

A tree about 20 m high, glabrous, or the younger branchlets and inflorescence more or less puberulent. Branches terete, brownish or olivaceous, smooth or slightly wrinkled when dry. Leaves oblong-elliptic to elliptic, coriaceous, 10 to 16 cm long, 5 to 7 cm wide, pale and somewhat shining when dry, the apex shortly and abruptly blunt-acuminate, the base acute or slightly acuminate, the margins entire, often slightly revolute; midrib prominent, the lateral nerves about 15 on each side of the midrib, slender, obscure on both surfaces, the primary ones hardly more prominent than are the secondary ones, the reticulations faint on the upper surface, obsolete or subobsolete beneath; petioles about 2 cm long. Cymes axillary, solitary, peduncled, about 3 cm in diameter, the peduncles about as long as the petioles. Flowers sessile in fascicles of three each at the tips of the umbellately disposed primary branches, 4-merous. Calyx shallowly cup-shaped, slightly puberulent, truncate, about 2 mm long, 3 mm in diameter, slightly puberulent outside and on the margins, strongly wrinkled when dry. Petals 4, narrowly oblong, 5.5 mm long, 1.8 mm wide, valvate, near the base the margins slightly coherent, the apex acute or obtuse, appendaged

inside. Stamens 4, the filaments about 4.5 mm long, flattened, 1 mm wide and of about the same width throughout, the anterior face at the base of the anther bearded with long hairs; anthers about 1 mm long, the back and apex of the connective very densely bearded with numerous, pale, rather stout, soft hairs about 4 mm long, the tips of the hairs somewhat club-shaped. Disk prominent, truncate. Ovary conical, glabrous, strongly wrinkled, tipped by the very short style.

BASILAN, *Hallier s. n.*, January, 1904 (type). MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9176 Whitford & Hutchinson*, December 9, 1907, in dipterocarp forests at an altitude of about 20 m.

A species in gross characters very similar to *Urandra apicalis* Thwaites, of Ceylon, but distinguished at once by its truncate calyx.

Urandra elliptica sp. nov.

Arbor glabra circiter 30 m alta; foliis coriaceis, ellipticis vel late ellipticis, utrinque late rotundatis vel apice abrupte brevissime acuminatis, coriaceis, nitidis, circiter 10 cm longis, nervis utrinque 4 vel 5; fructibus globosis, 1.5 cm diametro.

A glabrous tree about 30 m high, the trunk 90 cm in diameter. Branches terete, smooth, brown-olivaceous or reddish-brown. Leaves alternate, coriaceous, shining and of about the same color on both surfaces, elliptic or broadly elliptic, 8 to 11 cm long, 6 to 9 cm wide, equally and very broadly rounded at both ends, or the apex very abruptly and shortly acuminate; nerves 4 or 5 on each side of the midrib, distant, curved-ascending and faintly anastomosing, the reticulations lax, not prominent; petioles 1 to 1.5 cm long. Inflorescence (young) axillary, peduncled, of three or four spicately arranged, short branches, each branch with about 6 pairs of densely imbricated, distichous, broadly ovate, brown, 1 mm long bracteoles. Flowers unknown. Fruit globose, yellow and somewhat fleshy when fresh, about 1.5 cm in diameter, one or two developing from each branch of the inflorescence, the rachis slightly elongated, thickened, the peduncles of the fruits stout, 1 to 1.5 cm long.

LUZON, Province of Bataan, Duale, *For. Bur. 20003 Topacio*, September 14, 1909, in semi-open flat country, altitude about 100 m.

Well characterized by its broadly elliptic leaves.

SABIACEÆ.

MELIOSMA Blume.

Meliosma reticulata sp. nov.

Arbor parva, circiter 4 m alta, ramulis, foliolis ad nervos, petiolis, paniculisque dense ferrugineo-villosis; foliis imparipinnatis, foliolis 5 ad 11, ellipticis vel oblongo-ellipticis, coriaceis, utrinque valde reticulatis, apice rotundatis vel abrupte brevissime acuminatis, margine distanter denticulatis, nervis utrinque 8 ad 10, prominentibus; paniculis terminalibus, foliis subaequalibus; floribus numerosis, subsessilibus.

A small tree about 4 m high. Ultimate branches rather stout, dark-brown, glabrous or nearly so, nearly 1 cm in diameter, the growing parts smaller and densely ferruginous-villous. Leaves alternate, 40 cm long or less, the petiole, rachis, petiolules, and midrib and nerves on both surfaces of the leaflets densely ferruginous-villous; leaflets 5 to 11, elliptic to oblong-elliptic, coriaceous, 6 to 11 cm long, 3 to 6.5 cm wide, the base broad, rounded, the apex also broad, rounded or very abruptly and shortly acuminate, the margins in the lower half entire, above with few, small, scattered teeth; nerves 8 to 10 on each side of the midrib, prominent, anastomosing, and with the rather lax primary reticulations impressed on the upper surface, prominent beneath; petiolules 12 mm long or less. Panicles terminal, as long as the leaves, the branches few, the lower ones often 15 to 20 cm long, all parts densely ferruginous-villous. Flowers white, subsessile, the bracteoles about 2 mm long. Calyx-segments 4 or 5, ovate to suborbicular, the outer ones smaller than the inner and more or less ferruginous-villous. Three larger petals orbicular, about 3 mm in diameter, the two smaller ones reduced to mere scales less than 1 mm long and adnate to the filaments. Fertile stamens 2, the filaments less than 1.3 mm long.

LUZON, Province of Benguet, Losod, *Bur. Sci. 5594 Ramos*, December, 1908. I am inclined to refer here also *For. Bur. 15803 Curran*, from the Kuyapa District in Benguet, but the specimen is with nearly mature fruit, and differs from the type in being very much less pubescent, possibly due to development. The fruits are narrowly obovoid, slighly compressed, and about 6 mm long. The two specimens in other characters than the pubescence are very similar.

The species is well characterized by its dense ferruginous pubescence which extends even to the nerves on both sides of the leaflets, and by its very strongly reticulate leaflets.

VITACEÆ.

LEEA Linn.

Leea quadrifida sp. nov.

Arbuscula circiter 1 m alta; foliis pinnatis, foliolis circiter 10, oblongis, acuminatis, nervis utrinque circiter 12, subtus glandulis numerosis, brunneis, parvis sed prominentibus, conspersis; cymis brevibus, floribus congestis, 4-meris.

A shrub about 1 m high. Branches brown, somewhat pubescent. Leaves alternate, simply pinnate, 40 to 50 cm long, the rachis prominently longitudinally sulcate, the petiole not dilated at the base, when very young brown-puberulent. Leaflets oblong, firmly chartaceous, 14 to 20 cm long, 5 to 6 cm wide, the apex rather prominently acuminate, the base rounded, very slightly inequilateral, the margins obscurely and distantly crenulate or denticulate, the upper surface smooth, glabrous, grayish and somewhat shining when dry, the lower surface brown, pubescent or puberulent on the nerves and midrib, the whole surface with numerous, small, elevated, brown glands distinctly visible to the naked

eye; lateral nerves about 12 on each side of the midrib, prominent, somewhat ascending, nearly straight, anastomosing near the margin, the reticulations distinct on the lower surface; petiolules about 1 cm long. Inflorescence axillary, brown-pubescent, the stipe about 1 cm long, very stout, bearing about 4 primary branches 5 to 6 cm long, branched near the apex, and bearing numerous, subsessile, congested, white flowers. Calyx 4 to 5 mm long, slightly pubescent, brown when dry, 4-toothed, the teeth broadly ovate, 1.5 to 2 mm long, with few scattered glands. Corolla 6 mm long, the lobes 4, reflexed in anthesis, oblong, 3 mm long. Anthers 4, 2 mm long, connate, inflexed and included in the tube.

LUZON, Province of Laguna, Mount Maquiling, *For. Bur. 13309 Tamesis*, September 25, 1909, in forests, altitude about 700 m.

A most distinct species, well characterized by its prominently glandular leaflets, but especially by its 4-merous flowers, in the latter character differing from all species of the genus known to me.

MALVACEÆ.

ABUTILON Tourn.

Abutilon hirtum (Lam.) G. Don Gen. Syst. 1 (1831) 503.

Sida hirta Lam. Encycl. 1 (1783) 7.

Abutilon graveolens W. & A. var. *hirtum* Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 327.

MINDANAO, District of Zamboanga, *Mrs. Clemens 675, Hallier s. n.*

Widely distributed in the Tropics.

This is probably the form credited to the Philippines by F.-Villar[2] as *A. graveolens* W. & A. If the forms described as *Abutilon graveolens* W. & A., and *A. hirtum* (Lam.) G. Don, are varietally distinct, as several authors consider them, it is believed that the specific name should be that of the one first described.

GUTTIFERÆ.

CALOPHYLLUM Linn.

Calophyllum gracilipes sp. nov. § *Microphyllum.*

Arbor glabra circiter 12 m alta, ramis tenuibus, teretibus, ramulis valde quadrangulatis, circiter 1.5 mm diametro; foliis oblongo-ellipticis, firmiter membranaceis vel subcoriaceis, usque ad 9 cm longis, nitidis, subtus pallidis, basi acutis, apice breviter obtuse acuminatis; inflorescentiis axillaribus, solitariis, racemis 3-floris, pedicellis tenuibus, 2 ad 3 cm longis, floribus 4-meris, circiter 1.5 cm diametro.

A tree about 12 m high, glabrous throughout except the short, brown-puberulent terminal buds. Branches slender, terete, brown or olivaceous, the branchlets strongly 4-angled, slender, about 1.5 mm in diameter. Leaves oblong-elliptic, 5 to 9 cm long, 2 to 3.5 cm wide, firmly membranaceous or subcoriaceous, shining when dry, the lower surface paler

[2] Nov. App. (1880) 23.

than the upper, the base acute, the apex shortly and bluntly acuminate; nerves very numerous, densely disposed, about as prominent on one surface as on the other; petioles 5 to 10 mm long. Racemes axillary, solitary, 3-flowered, the peduncles slender, about 1 cm long, the pedicels very slender, 2 to 3 cm long, umbellately arranged at the apex of the peduncle. Flowers white, the outer two sepals broadly ovate, obtuse, about 5 mm long, the inner two similar but petaloid. Petals 4, elliptic or elliptic-ovate, about 8 mm long. Stamens indefinite. Ovary glabrous, globose or ovoid; style 4 mm long.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9405 Whitford & Hutchinson*, February 3, 1908, in ridge forests at an altitude of about 600 m; also represented by *Williams 2193*, from the Sax River, same district, February 28, 1905.

A species similar in vegetative characters to *Calophyllum whitfordii* Merr., at once recognizable by its 3-flowered, solitary, axillary racemes, and very slender, elongated pedicels.

Calophyllum racemosum sp. nov. § *Inophyllum*.

Arbor circiter 11 m alta, glabra, gemmis ferrugineo-puberulis exceptis; foliis coriaceis, oblongo-ellipticis, usque ad 25 cm longis, nitidis, basi acutis, apice acuminatis, margine distincte revolutis; racemis simplicibus, axillaribus, solitariis, usque ad 10 cm longis, floribus circiter 2 cm diametro.

A tree about 11 m high, glabrous except the ferruginous-puberulent terminal buds which are lanceolate and 1 to 1.5 cm long. Branches stout, terete, somewhat rugose, brown to olivaceous, the branchlets somewhat angled, sulcate. Leaves coriaceous, oblong-elliptic, 15 to 25 cm long, 4 to 7 cm wide, shining, when dry about the same color on both surfaces, or somewhat paler beneath, the apex distinctly and rather abruptly acuminate, the base acute, the margins rather strongly revolute; nerves very numerous, close, about equally distinct on both surfaces; petioles rather stout, 1 to 2 cm long. Racemes axillary, solitary, 10 cm long or less, simple, each with from 6 to 10 flowers, the pedicels 1 to 2 cm long, those of the lower flowers the longer. Sepals orbicular-ovate, 8 to 10 mm long. Petals 4. Stamens indefinite. Fruit (immature) ovoid, glaucous, smooth, 1 to 1.5 cm long, apiculate.

LEYTE, between Dolores and Ormoc, *For. Bur. 12620 Rosenbluth* (type), February 26, 1909, in forests, altitude about 100 m. I am disposed to refer here also the following specimens from Mindanao: Lake Lanao, Camp Keithley, *Mrs. Clemens 1009*, a luxuriant form, the racemes forming almost leafless, terminal panicles, and *Williams 2124*, 2346, with immature fruits, from the Sax River, District of Zamboanga.

A species well characterized by being entirely glabrous, except the terminal buds, the margins of the leaves distinctly revolute, and the flowers arranged in simple racemes. It is probably as closely allied to *Calophyllum blancoi* Pl. & Tr., as to any other species but is distinguished by the above characters.

Calophyllum amplexicaule Choisy ex Planch. & Triana in Ann. Sci. Nat. IV 15 (1861) 281; Vesque in DC. Monog. Phan. 8 (1893) 564; Vidal Phan. Cuming. Philip. (1885) 96, Rev. Pl. Vasc. Filip. (1886) 54.

Tovomita pentapetala Blanco Fl. Filip. (1837) 432, ed. 2 (1845) 301, ed. 3, 2:194.

Ochrocarpus pentapetalus F.-Vill. Nov. App. (1880) 17.

LUZON, Province of Ilocos Norte, *Cuming 1077* (type number): Province of Pangasinan, Salasa, *For. Bur. 9625 Zschokke:* Province of Zambales, *For. Bur. 8226, 8229, 8236 Curran & Merritt, Bur. Sci. 4755, 5100 Ramos.*

This species is here enumerated chiefly to call attention to the reduction of Blanco's *Tovomita pentapetala,* which was referred by F.-Villar to *Ochrocarpus.* Blanco's material was from the Provinces of Ilocos Norte and Sur, and he speaks of the plant as being common near the seashore, flowering in December, and locally known as *Pamitlain* and *Pamitlatin.* The specimen collected by Cuming, on which *Calophyllum amplexicaule* Choisy was based, was also from Ilocos Norte, according to Cuming's own list of localities, and not from Albay, as stated by Vesque; that the former is probably correct is borne out by the fact that the species is only known from northern Luzon, and has so far never been found in the south. Blanco's description applies absolutely to *Calophyllum amplexicaule* with the exception of the flowers, which he describes as having two sepals, and five petals. This was undoubtedly an error on his part, due to misconception of the parts of the flower. This is the only plant known to me that agrees with Blanco's description as to its resinous properties, sessile leaves, etc., and even to the axillary glands mentioned by him, these glands being really the axillary buds. The specimen from Pangasinan was received under the native name "*Pamitaoyon.*"

Blanco's specific name is hence the oldest available one for the species, but I am loath to transfer it to *Calophyllum,* as it was apparently selected by him on a misconception of the floral parts, and in no way applies to any species of the genus, all the species of *Calophyllum* having 4-merous flowers.

GARCINIA Linn.

Garcinia cordata sp. nov. § *Eugarcinia.*

Arbor glabra circiter 8 m alta; foliis sessilibus vel subsessilibus, ovato-lanceolatis vel late lanceolatis, chartaceis vel subcoriaceis, nitidis, apice acutis vel obscure acuminatis, basi late rotundatis distincte cordatis, nervis utrinque 20 ad 25; floribus axillaribus, fasciculatis, pedicellatis, 4-meris, staminibus numerosis, in phalangibus 4 brevissime stipitatis vel subsessilibus dense congestis; pistilli rudimento fungiforme.

A glabrous tree about 8 m high. Branches brown, terete, the branchlets distinctly 4-angled, frequently olivaceous. Leaves opposite, sessile or subsessile, ovate-lanceolate to broadly ovate-lanceolate, 10 to 16 cm long, 3.5 to 6 cm wide, broadest in the lower part, chartaceous or subcoriaceous, shining, the apex acute or obscurely acuminate, the base broad, rounded, distinctly cordate; lateral nerves 20 to 25 on each side of the midrib, slender, irregular, the reticulations nearly obsolete. Flowers axillary, fascicled, white, 4-merous, 4 to 8 in each axil, their pedicels about 7 mm long. Outer two sepals elliptic-ovate, obtuse, 4 mm long, smaller than the inner two which are petaloid. Petals membranaceous,

elliptic-ovate, rounded, concave, 5 to 6 mm long. Stamens indefinite, arranged on both sides of four very slightly stipitate or subsessile, narrowly obovoid phalanges. Rudimentary ovary fungiform, the stipe about 3 mm long, the stigma circular, 2 mm in diameter.

LUZON, Province of Cagayan, San Vicente, *For. Bur. 17236 Curran*, March 8, 1909, on river banks near sea level.

A species well characterized by its ovate-lanceolate or broadly lanceolate, sessile leaves which are broadest in the lower part and distinctly cordate at the base. Among the Philippine species apparently allied to *Garcinia dives* Pierre, and *G. eugeniaefolia* Wall., but very different from both.

KAYEA Wall.

Kayea brevipes sp. nov. § *Eukayea*.

Arbor glabra circiter 10 m alta; foliis anguste oblongo-ellipticis vel anguste oblongis, usque ad 23 cm longis, subcoriaceis, nitidis, basi acutis, apice acuminatis, nervis utrinque circiter 30, petiolo crasso, furfuraceo, 3 ad 4 mm longo; floribus axillaribus, solitariis, sessilibus vel brevissime pedicellatis, circiter 2.6 cm diametro.

A glabrous tree about 10 m high. Branches and branchlets terete, grayish-brown, rather slender. Leaves narrowly oblong-elliptic or narrowly oblong, 15 to 23 cm long, 2 to 4 cm wide, narrowed towards both ends, the base acute, the apex sharply acuminate, subcoriaceous, when dry shining and somewhat pale; primary nerves about 30 on each side of the midrib, not prominent, anastomosing, the alternating secondary nerves frequently nearly as distinct; petioles stout, furfuraceous, 3 to 4 mm long. Flowers yellow, solitary, axillary, sessile or subsessile, about 2.6 cm in diameter. Outer two sepals orbicular-ovate, 7 to 8 mm long, coriaceous, concave, obtuse, the inner two similar, thinner. Petals oblong-obovate, about 13 mm long, the apex broad, retuse. Stamens indefinite. Ovary glabrous, 1-celled, 8-ovulate.

LUZON, Province of Nueva Vizcaya, Amucucan, *For. Bur. 14846 Darling*, May 13, 1909, along streams at an altitude of about 500 m, locally known as *babac*.

A species allied to *Kayea navesii* (F.-Vill.) Vesque, differing especially in its much shorter petioles and larger flowers. It is probably the species identified by Vidal as "*Ochrocarpus longifolius* Thouars ? ," and of which he figures a leaf only (Sinopsis Atlas (1883) *t. 12, f. E.*).

VIOLACEÆ.

VIOLA Linn.

Viola patrinii Ging. in DC. Prodr. 1 (1824) 293; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 (1872) 183; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1886) 53.

LUZON, Province of Cagayan, *For. Bur. 17095 Curran:* District of Lepanto, *Merrill 4452, 4499:* Province of Benguet, *Bur. Sci. 5899, 5999 Ramos, For. Bur. 5097, 10940 Curran, Bur. Sci. 2472, 2767, 3554 Mearns.* MINDORO, *For. Bur. 9771 Merritt.* MINDANAO, Lake Lanao, *Mrs. Clemens 21*, and several unnumbered specimens: Bokidnon, *Worcester.*

Not previously reported from the Philippines; India to Amur and Manchuria, Japan, China and Formosa: reported also from Timor. As in China, the species is very variable in the Philippines.

Viola diffusa Ging in DC. Prodr. 1 (1824) 293; Forbes & Hemsl. l. c. 52.

LUZON, District of Lepanto, Balili, *Merrill 4612*, November, 1905, growing in crevices of rocks on terraces of coffee plantations.

Himalaya and Khasia Mountains to China and Formosa; not previously reported from the Philippines.

Viola mearnsii sp. nov.

Planta nana, glabra, acaulis, vix stolonifera, 2 ad 3 cm alta; foliis ovatis vel late cordato-ovatis, acutis vel obtusis, crenatis, membranaceis, 1 ad 1.5 cm longis, basi cordatis; stipulis lineari-lanceolatis, acuminatis, 4 ad 5 mm longis, parce setaceo-dentatis; bracteolis 2, linearibus, circiter 4 mm longis; floribus albis, circiter 6.5 mm longis, calcare saccato.

A small, glabrous, acaulescent, non-stoloniferous plant 2 to 3 cm high or less. Leaves membranaceous, ovate or broadly cordate-ovate, obtuse or acute, base strongly cordate, the lobes and sinus rounded, margins crenate, 1 to 1.5 cm long, nearly as wide; petioles slender 1 to 1.5 cm long; stipules linear-lanceolate, acuminate, 4 to 5 mm long, slightly setaceous-dentate. Peduncles about 3 cm long, often shorter, slender, glabrous, bearing above the middle a pair of linear bracts about 4 mm long. Flowers white, solitary, about 6.5 mm long. Sepals ovate-lanceolate, acuminate, glabrous, 3 mm long, 3-nerved. Spur ovoid, saccate, 2 mm long or less.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4625 Mearns & Hutchinson* (type), May, 1906. Two specimens from Luzon are apparently referable here, *Copeland s. n.*, from Mount Banajao, Province of Laguna, and *Bur. Sci. 4310 Mearns* from Pauai, Province of Benguet.

RINOREA Aubl.

Rinorea acuminata sp. nov. § *Prothesia.*

Arbuscula circiter 2.5 m alta subglabra, ramulis junioribus inflorescentiisque exceptis; foliis membranaceis vel chartaceis, nitidis, oblongis vel anguste oblongo-ellipticis, apice valde tenuiter acuminatis, basi acutis, nervis utrinque circiter 18, prominentibus; cymis axillaribus, brevibus, ferrugineo-pubescentibus; staminibus inclusis, antheris liberis.

A shrub about 2.5 m high, the branchlets and inflorescence rather densely ferruginous-pubescent, the branches gray, ultimately glabrous, lenticellate. Leaves membranaceous or chartaceous, oblong or narrowly oblong-elliptic, about 20 cm long, 7 to 8 cm wide, shining, glabrous, or when young with very few hairs beneath, especially on the midrib, the apex strongly and slenderly sharp-acuminate, base acute, margins subentire, very obscurely glandular-crenate, or very obscurely glandular-undulate; nerves about 18 on each side of the midrib, prominent, the reticulations subparallel; petioles pubescent or glabrous, 1 to 1.5 cm long. Cymes axillary, few-flowered, about as long as the petioles, fer-

ruginous-pubescent. Sepals orbicular or orbicular-ovate, rounded, pubescent externally, 5 mm in diameter. Petals glabrous, elliptic-oblong, glabrous, obtuse, 4.5 mm long, 3 mm wide. Disk 1 mm long, the stamens inserted on it, included, their filaments 1 mm long; appendage to the connective orbicular, rounded, 1 mm in diameter, membranaceous, the anther-cells tipped with a narrow appendage. Ovary pubescent; style glabrous, 2 mm long.

CEBU, Mount Licos, *For. Bur. 6455 Everett,* February, 1907, on steep rocky slopes, altitude 400 m. V., *Maupao.*

A species very closely allied to *Rinorea copelandii* Merr., differing especially in its nearly glabrous, very strongly acuminate leaves, fewer-flowered cymes, and somewhat larger flowers.

A specimen from the Catanduanes Islands, *For. Bur. 6682 Pray* is probably referable here, differing from the type in its nearly glabrous branchlets.

COMBRETACEÆ.

TERMINALIA Linn.

Terminalia darlingii sp. nov. § *Diptera.*

Arbor subglabra circiter 10 m alta; foliis coriaceis, ad apices ramulorum densissime dispositis, anguste oblongo-obovatis, nitidis, apice abrupte subtruncato-rotundatis, late breviter acuminatis, basi sensim angustatis, nervis utrinque 12 ad 14, petiolo 1 ad 1.5 cm longo; fructibus in spicis patulis vel reflexis dense dispositis, ellipticis, compressis, 3 cm longis, 2-alatis.

A tree about 10 m high, nearly glabrous throughout. Branches stout, the ultimate branchlets much thickened at the ends for the upper 6 to 8 cm and there up to 1.5 cm in diameter, strongly marked with the scars of fallen petioles. Leaves densely crowded at the apices of the branchlets, coriaceous, yellowish-brown and shining when dry, glabrous, narrowly obovate-oblong, about 20 cm long, about 7 cm wide near the apex, the tip abruptly subtruncate-rounded and shortly, broadly acuminate, gradually narrowed from the upper one-fourth or one-fifth to the narrow, cuneate base; midrib very prominent, the lateral nerves 12 to 14 on each side of the midrib, prominent, anastomosing; petioles stout, slightly pubescent with appressed hairs, 1 to 1.5 cm long. Flowers unknown. Fruiting spikes in the axils of the upper leaves, 3 to 5 or more on each branchlet, spreading or recurved, about 15 cm long, the peduncles 5 to 7 cm long, terete. Fruits very densely disposed, elliptic, about 3 cm long, 2 cm wide, strongly compressed, flattened or rounded on one side, triangular-keeled on the other, surrounded by a thin, straw-colored wing nearly 1 cm wide, rounded or acute at the base, apex more or less retuse.

LUZON, Province of Camarines, Mambulao, in forests, altitude about 100 m, *For. Bur. 18735 Darling,* April 6, 1910.

A very characteristic species, readily recognizable by its crowded leaves which are narrowly oblong-ovate and gradually narrowed from about the upper one-

fourth to the base, and especially by its strongly compressed, 2-winged fruits which are borne in dense, peduncled, spreading or reflexed spikes. Locally known to the Negritos as *pagatpagat*, and to the Tagalogs as *malaputat*.

MELASTOMATACEÆ.

ASTROCALYX gen. nov.

Calyx dense molliter furfuraceo-setaceus, tubus infundibuliformis; limbus 5-lobatus. Petala 5, elliptico-ovata, acuminata, imbricata. Stamina circiter 65, aequalia, filamentis filiformibus, elongatis; antherae anguste lineari-oblongae, teretae, rectae, basi angustatae, apice suboblique truncatae, 2-rimosae, connectivo basi nec elongato nec incrassato ecalcarato. Ovarium calyci adhaerens, 5-loculare; ovula plurima, placentis incrassatis angulo inferiore loculorum affixa; stylus elongatus, stigmate punctiformi. Arbor, ramulis, petiolis, subtus foliis ad nervos, inflorescentiisque dense molliter brunneo-furfuraceo-setaceis. Folia opposita, petiolata, integra, elliptica vel oblongo-elliptica, basi 5-plinervia, nervulis transversalibus numerosis, distinctis. Flores in paniculis terminalibus dispositi, mediocres, minute bibracteolati.

Astrocalyx pleiosandra sp. nov.

Arbor circiter 25 m alta; foliis subcoriaceis, 10 ad 20 cm longis, 3.5 ad 8 cm latis, breviter acuminatis, basi acutis.

A tree about 25 m high. Branches rather slender, terete, glabrous, light-gray or brownish, the growing parts densely covered with brown, rather soft, furfuraceous-setaceous indumentum, as are the petioles, inflorescences, and nerves on the under surfaces of the leaves. Leaves opposite, elliptic to oblong-elliptic, 10 to 20 cm long, 3.5 to 8 cm wide, subcoriaceous, entire, the base acute, the apex shortly and rather broadly blunt-acuminate, the upper surface green or olivaceous when dry, glabrous, dull or slightly shining, the lower surface of about the same color; longitudinal nerves 5, the two inner ones leaving the midrib at from 0.5 to 2 cm above the base, extending to the apex, nearly as prominent as the midrib, the outer pair near the margin, more slender, leaving the midrib almost at the base of the lamina, scarcely reaching the apex of the leaf, more or less looped by the anastomoses of the transverse veins; transverse veins about 20 between the midrib and the first longitudinal pair of nerves, distinct, parallel, spreading, alternating with similar nerves between the first and second pairs of longitudinal nerves; petioles 1 to 3 cm long. Inflorescence terminal, 8 to 15 cm long, branched at or above the base, the primary branches 3 to 5 cm long, the branches flower-bearing above the middle. Flowers red, borne in threes on the ultimate branchlets, the branchlets subtended by a pair of narrowly oblong, 4 mm long bracts, the flowers subtended by a pair of similar but much smaller bracteoles; pedicels 3 to 4 mm long. Calyx broadly funnel-shaped, the tube in anthesis 4 mm long, about 7 mm wide, the limb with 5,

lanceolate, thickened, acuminate, 3 mm long lobes or teeth, these teeth narrow and keeled on the inside. Petals 5, glabrous, in bud strongly rostrate, imbricate, elliptic-ovate to elliptic-oblong, slightly inequilateral, acuminate, about 9 mm long, 5 to 6 mm wide. Stamens about 65, 1-seriate, subequal, the filaments slender, more or less coherent below in five phalanges, some or all ultimately free or nearly so, 7 to 8 mm long, glabrous; anthers narrowly linear-oblong, terete, straight or nearly so, erect, in bud inflexed, gradually narrowed to the base, about 5 mm long, 0.5 mm in diameter, the connective not produced, appendages none, opening by two terminal slits, each cell prolonged into a 0.5 mm long, compressed tube, slightly obliquely truncate. Ovary adherent to the calyx, 5-celled, the ovules indefinite, on all sides of the thickened placenta which is attached in the lower inner angle; style elongated, rather stout, about 12 mm long; stigma 0.5 mm in diameter, punctiform. Fruit unknown.

LUZON, Province of Camarines, near Daet, *For. Bur. 14349 bis Aguilar*, July, 1909, in forests near the Maniba River (type): Province of Laguna, Dajican, *Bur. Sci. 8983 Foxworthy*, July, 1909, altitude about 300 m.

Aguilar states that the flowers are red, and his specimens bear open flowers; Foxworthy states that they are greenish-white, but on his specimen the flowers are not quite mature. The diameter of the trunk is given by Aguilar as 27 cm, and by Foxworthy as 25 cm.

This new genus belongs in the *Astronieae*, and is perhaps most closely allied to the Bornean monotypic genus *Plethiandra*. It is, however, very different from that genus and from all others in the tribe and family. Characteristic features are its prominently 5-lobed star-shaped calyx, and especially its very numerous stamens, the anthers being slender and gradually narrowed to the base, opening by two terminal slits, the cells being produced into very short, compressed tubes, the connectives not produced and in no way appendiculate.

In the entire family the only genera previously known in which numerous stamens are found are the Bornean *Plethiandra*, mentioned above, and the American ones *Calyptrella* and *Miconia*.

CEPHALOMEDINILLA gen. nov.

Flores 4-meri. Calycis tubus ovoideus, limbus valde 4-lobatus. Petala anguste oblongo-obovata, leviter inaequiliteralia, rotundata vel subacuta. Stamina petalorum numero dupla, aequalia; antherae lineari-lanceolatae, elongatae, apice 1-porosae, connectivo basi non producto, antice bilobo, postice minute 1-calcarato. Ovarium calycis tubo adhaerens, 4-loculare, vertice dense pilosum. Ovula in loculis numerosa, placentis prominulis angulo interiore loculi affixis; stylus elongatus, stigmate punctiformi. Bacca ignota. Frutex scandens, ramulis foliis junioribus inflorescentiisque plus minus dense simpliciter pilosis. Folia opposita, sessilia, valde inaequalia, integerrima, penninervia. Flores in capitulis axillaribus, sessilibus, multifloris dispositi, rosei; alabastro in bractea clausa incluso.

Cephalomedinilla anisophylla sp. nov.

Frutex scandens circiter 2 m altus; ramis teretibus, griseis, ramulis foliis junioribus inflorescentiisque plus minus dense pilosis, pilis simplicibus, albis; foliis oppositis, elliptico-oblongis, chartaceis vel submembranaceis, acuminatis, sessilibus, valde inaequalibus, majoribus usque ad 15 cm longis, minoribus vix 2.5 cm longis; nervis utrinque 4, curvato-adscendentibus; inflorescentiis capitatis, axillaribus, solitariis, 1.5 ad 2 cm diametro, dense multifloris, bracteis numerosis late ovatis involucratis; floribus 4-meris, subsessilibus vel brevissime pedicellatis.

A scandent shrub about 2 m high. Branches terete, rather slender, glabrous, light-gray, the younger branchlets densely pilose with long, simple, pale or brownish hairs. Leaves opposite, sessile, elliptic-oblong, chartaceous or submembranaceous, very unequal, the larger ones of each pair 12 to 15 cm long, 5 to 6 cm wide, the smaller ones less than 2.5 cm long and 1 cm wide, rather prominently acuminate, the base gradually narrowed, acute or obtuse, the younger ones more or less densely covered with pilose hairs, becoming quite glabrous; midrib prominent, the four pairs of lateral nerves leaving the midrib in the lower one-half of the leaf, the innermost two pairs reaching to the apex, curved-ascending, the reticulations transverse, distinct, subparallel. Heads solitary, sessile, in the leaf-axils or in the axils of fallen leaves, hemispheric, 1.5 to 2 cm in diameter, each with from 12 to 20 densely arranged subsessile flowers, each head subtended by about 10 broadly ovate, membranaceous, more or less pilose, somewhat acuminate, imbricate, pink or reddish bracts, 10 to 11 mm long, 8 to 9 mm wide. Flowers 4-merous, pink, each subtended by two bracteoles, one elliptic-ovate, flat, the other entirely inclosing the bud, at length splitting down one side and when spread suborbicular-ovate, about 9 mm in diameter, cleft to the middle into two elliptic-ovate lobes, the sinus acute, the lobes faintly 3- to 5-nerved, more or less pilose. Calyx 6 to 7 mm long, ovoid, somewhat narrowed to the base, very densely pilose with long, soft, simple, white hairs, the limb 4 mm long, cleft into four narrowly ovate, acute or acuminate, 2.5 to 3 mm long lobes, pilose on both sides. Petals 4, imbricate, thin, glabrous, 8 to 9 mm long, narrowly oblong-obovate or obovate-subspatulate, much narrowed in the lower one-half, about 4 mm wide, the apex somewhat inequilateral, rounded or subacute. Stamens 8, equal; filaments slender, 5 mm long; anthers lanceolate, 4 mm long, somewhat curved, acuminate, opening by a terminal pore, the connective not at all produced, the base in front with two short, more or less connate, somewhat curved, thick lobes less than 1 mm long, and with a small, 0.3 mm long spur behind. Ovary adherent to the calyx, 4-celled, the top densely pilose with long white hairs; ovules many, the placenta

attached to the lower inner angle of each cell; style slender, 9 mm long; stigma punctiform.

LUZON, Province of Laguna, Dajican, near Paete, *Bur. Sci. 8986 Foxworthy*, July 25, 1909, in forests, altitude not given.

This proposed new genus is manifestly closely allied to *Medinilla*, differing especially in its produced and prominently 4-lobed calyx-tube and densely pilose top of the ovary. It differs also from that genus in its dense, hemispherical, sessile, involucrate heads, and in its buds being entirely inclosed within one of the bracteoles, the bracteole later splitting and becoming 2-lobed; it also differs from most of the known species of *Medinilla* in its very unequal leaves.

MEDINILLA Gaudich.

Medinilla cardiophylla sp. nov.

Species M. myrtiformi simillima et valde affinis, differt foliis paulo majoribus, basi late rotundatis valde cordatis.

An epiphytic shrub about 1.5 m. high, glabrous throughout. Branches slender, terete, reddish-brown or grayish. Leaves ovate to ovate-lanceolate, opposite, subcoriaceous, 7 to 10 cm long, 3 to 4.5 cm wide, the base broad and rounded, rather strongly cordate, the apex long and rather slenderly acuminate, the acumen blunt, 5-plinerved, the interior pair prominent and reaching the apex of the leaf, the outside pair much fainter and reaching to about the middle of the leaf, the reticulations very faint or subobsolete; petiole about 1 mm long or almost wanting. Cymes axillary, solitary, slender, few-flowered, 3 to 5 cm long, the peduncles 3.5 cm long or less, the pedicels slender. Flowers 4-merous. Calyx somewhat campanulate, 3 to 3.5 mm long, base narrowed, limb produced about 1 mm and with four small, distant teeth. Petals 4, oblong-lanceolate, somewhat acuminate, about 6 mm long, 2.2 mm wide. Stamens 8, the four longer ones about 6 mm long, the four shorter ones 5 mm long; anthers 3 to 3.5 mm long, lanceolate, straight, the connective not produced, with a dorsal, stout, broad, 0.5 mm long spur, the front with two broad, rather obscure auricles. Ovary 4-celled; style about 6 mm long; stigma punctiform. Fruit scarlet, globose, 6 mm in diameter, crowned by the minute calyx-teeth.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 861*, December, 1906, in fruit, *s.n.*, September, 1907, in flower (type). LUZON, Province of Albay, Mount Mayon, *Bur. Sci. 6509 Robinson*, September 6, 1908, on trees in stream depressions, altitude 400 m.

A species manifestly very closely allied to *Medinilla myrtiformis* Triana, differing in the points stated in the diagnosis. The present species with *M. myrtiformis* Triana and *M. ramiflora* Merr. form a group of closely allied forms which perhaps have as much the characters of *Anplectrum* as of *Medinilla*. *Medinilla ramiflora* Merr. may not prove to be specifically distinct from the Bornean *Anplectrum homoeandrum* Stapf.

Medinilla cauliflora sp. nov.

Arbuscula circiter 3 m alta, foliis junioribus subtus ad nervos, ramulisque plus minus plumoso-stellato-tomentosis; foliis oppositis, membranaceis, acuminatis, elliptico-ovatis, basi angustatis, 5-plinerviis, breviter petiolatis; inflorescentiis caulifloris, densissime confertis; floribus 4-meris, bracteatis, calycibus obscure 4-angulatis, 4-lobatis, lobis 5-7-nerviis; staminibus 8, admodum inaequalibus, antheris postice longe calcaratis.

A shrub about 3 m high, the branchlets and the younger leaves on the midrib and nerves beneath more or less covered with soft, stellate-plumose hairs. Branches rather slender, grayish, terete or obscurely 4-angled, the upper axils more or less bearded. Leaves opposite, membranaceous, elliptic-ovate, 9 to 15 cm long, 4 to 7.5 cm wide, the apex shortly acuminate, the base narrowed and acute or slightly acuminate; nerves three on each side of the midrib, leaving it in the lower one-third, curved-ascending, the innermost pair reaching to the apex, distinct, the transverse reticulations slender, distant, not prominent; petioles 5 mm long or less, sometimes subobsolete. Inflorescence on the trunk below the leaves, of very short, congested branches, forming a compact mass 8 cm in diameter or less, the branches stout, each bearing many, subdistichous, oblong-ovate, crowded, 9 to 10 mm long bracts which are acute or obtuse, some empty, some subtending flowers. Flowers pink or red, 4-merous, glabrous, the pedicels stout, 4 mm long. Calyx obovoid, becoming more or less urceolate, obscurely 4-angled, 6 mm long, constricted below the limb, the limb produced, 2.5 to 3 mm long, cleft nearly to its base into four, broadly ovate, 5- to 7-nerved, apiculate lobes. Petals obovate, 7 to 8 mm long, 4 to 5 mm wide, the apex strongly inequilateral, obliquely truncate, base narrowed. Stamens 8, the filaments of four about 5 mm long, of the other four 5.5 mm in length; anthers equal, 3.5 mm long, oblong-lanceolate, slightly curved, opening by a single terminal pore, the base with a slender, curved, dorsal spur nearly 2 mm in length, in front with two stouter, curved auricles less than 1 mm long. Ovary 4-celled, the lower one-half adherent to the calyx, free above, the top more or less conical, glabrous; style joined with the ovary, at least 5 mm long; stigma punctiform. Berry globose, fleshy, pink, 7 to 8 mm in diameter; seeds indefinite, 0.7 to 0.8 mm long.

NEGROS, Canlaon Volcano, *For. Bur. 17397 Curran*, September, 1909, in forests at an altitude of about 1,200 m.

A species well characterized by its dense, cauline inflorescence and its 4-lobed calyx-limb, the lobes distinctly nerved. It is apparently not very closely allied to any described species.

Medinilla clementis sp. nov.

Frutex glaber ut videtur scandens, ramulis angulatis, valde quadrialatis; foliis subcoriaceis, oppositis, petiolatis, oblongis, acuminatis, basi rotundatis vel leviter subcordatis, usque ad 28 cm longis, 7- vel 9-plinerviis; inflorescentiis terminalibus, elongatis, bracteis parvis; floribus 5-meris.

A shrub, apparently scandent, glabrous throughout. Branches stout, 4-angled, the angles winged, the wings 2 to 3 mm wide, the nodes setose. Leaves opposite, oblong, subcoriaceous, somewhat shining, 20 to 28 cm long, 7 to 11 cm wide, the apex acuminate, the base rather broad, rounded, often somewhat subcordate; nerves 7 or 9, the outer ones basal, the interior one or two pairs leaving the midrib shortly above the base and reaching the apex, the reticulations obsolete or nearly so; petioles 2.5 to 3 cm long. Inflorescence terminal, long-peduncled, slender, 25 to 40 cm long, the branches few, short, the bracts 5 to 7 mm long. Pedicels about 1 cm long. Calyx cup-shaped, about 4 mm long, the limb somewhat produced, truncate. Petals 5, pink, narrowly obovate, inequilateral, about 10 mm long, 5 mm wide. Stamens 10, equal, the filaments 6 mm long; anthers narrowly lanceolate, somewat curved, 6 mm long, the basal dorsal spur slender, less than 5.5 mm long, the anterior two auricles stout, about 1 mm long. Style slender, 13 mm long.

MINDANAO, Lake Lanao, Sacred Mountain near Camp Keithley, *Mrs. Clemens s. n.*, July, 1907 (type), and between Camp Keithley and Malabang, *Mrs. Clemens s. n.*, November, 1906.

A species well characterized by the details given in the diagnosis; it is perhaps as closely allied to *Medinilla teysmanni* Miq. as to any other described form, but is quite different from Miquel's species.

Medinilla obovata sp. nov.

Frutex epiphyticus, glaber, vel ramulis junioribus plus minus brunneo-furfuraceis; foliis parvis, verticillatis, ternis vel quarternis, coriaceis, obovatis, petiolatis, apice late rotundatis vel leviter retusis, vix 3 cm longis, triplinerviis, reticulis obsoletis; floribus ignotis, ut videtur 6-meris, longe pedicellatis, solitariis, vel in cymis paucifloris dispositis, axillaribus; fructibus urceolatis, limbo calycis producto truncato.

A glabrous epiphytic shrub, or the ultimate branchlets more or less brown-furfuraceous. Branches stout, grayish, terete, the branchlets somewhat quadrangular, the internodes short, mostly less than 1 cm in length, the nodes not barbellate. Leaves whorled, in threes or fours, coriaceous, obovate, less than 3 cm long, and less than 1 cm in width, the apex broadly rounded or somewhat retuse, narrowed below to the cuneate base, the margins sometimes recurved; nerves 3 only, the lateral pair leaving the midrib shortly above the base, the reticulations obsolete; petioles about 5 mm long. Flowers unknown. Infrutescence axillary, the peduncles solitary, axillary, about 1 cm long, each bearing a single pedicel as long

or longer than the peduncle, the fruits urceolate, about 8 mm long, 6 mm in diameter, the calyx-limb persistent, truncate, produced about 4 mm, 6-celled.

NEGROS, Mount Marapara, *For. Bur. 17353 Curran*, September 11, 1909, epiphytic on trees in forests, altitude about 500 m.

Although the specimen is without flowers I have no doubt but that it is referable to *Medinilla*, even though the fruits are distinctly 6-celled, indicating a 6-merous flower, a character uncommon in the genus. It is well characterized by its comparatively very small leaves which are whorled, petioled, and broadly obovate, the veins three only, and the reticulations obsolete. The fruits are solitary, but at the junction of the pedicels with the peduncles are found some minute scars indicating a few-flowered, probably cymose, or possibly umbellate inflorescence. *Medinilla obovata* has much smaller leaves than most of the other Philippine species of the genus.

Medinilla whitfordii Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 37.

Carionia triplinervia Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 310; Vid. Rev. Pl. Vasc. Filip. (1886) 136; Cogn. in DC. Monog. Phan. **7** (1891) 571, non *Medinilla triplinervia* Cogn.

LUZON, District of Lepanto, Mount Data, *For. Bur. 10956 Curran:* Province of Benguet, Pauai, *Bur. Sci. 4478 Mearns;* Pauai to Baguio, *Merrill 4779:* Province of Zambales, Mount Pinatubo, *Bur. Sci. 2556 Foxworthy*, Provinces of Laguna and Tayabas, Mount Banajao, *Whitford 961* (type of *M. whitfordii*), *Bur. Sci. 6062 Robinson, Bur. Sci. 2388 Foxworthy, For. Bur. 7899 Curran & Merritt:* Province of Albay, Mount Mayon, *Vidal 779* in herb. Kew (type of *Carionia triplinervia* Rolfe), *Bur. Sci. 6504 Robinson.*

Reëxamination of the type of *Medinilla whitfordii* Merr. shows that its flowers are 6-merous instead of 5-merous as originally described, and comparison of our recently collected Philippine material with the type of *Carionia triplinervia* Rolfe at Kew has shown that *Medinilla whitfordii* Merr. is identical. The species is to me a *Medinilla* rather than a *Carionia*, in spite of its 6-merous flowers. *Carionia* is distinguished from *Medinilla* by its 6-merous flowers and its spreading 4 to 5 mm long calyx-teeth, but *Carionia triplinervia* has a truncate calyx with only very minute teeth, and in all other respects is a typical *Medinilla;* either it must be transferred to *Medinilla*, or the few species with 6-merous flowers now placed in *Medinilla* must be transferred to *Carionia*. *Medinilla* has 4- to 6-merous flowers, and it would be just as logical to segregate those species with 4-merous flowers in one genus, and those with 5-merous flowers into another, as it would be to refer species like the present with 6-merous flowers but with a truncate calyx to *Carionia*. The specific name selected by Mr. Rolfe is invalidated in *Medinilla*.

MEMECYLON Bl.

Memecylon sessilifolium sp. nov.

Arbor glabra circiter 16 m alta; ramulis acute tetragonis, angustissime alatis, crassis; foliis sessilibus, coriaceis, nitidis, usque ad 12 cm longis, late obtuseque acuminatis, penninerviis, nervis vix distinctis. Fructibus fasciculatis vel solitariis, pedicellatis, 1 ad 1.5 cm diametro.

A glabrous tree about 16 m high. Branches stout, subterete, covered with a thin, grayish bark, the branchlets sharply 4-angled, very narrowly winged on the angles, the wings less than 0.5 mm wide. Leaves sessile,

oblong or narrowly obovate-oblong, firmly coriaceous, yellowish and shining when dry, 8 to 12 cm long, 3 to 5 cm wide, the apex broadly and obtusely acuminate, the base subacute, margins recurved; lateral nerves not distinct, about 25 on each side of the midrib, nearly obsolete beneath. Flowers unknown. Fruit axillary, solitary or fascicled, subglobose, 1 to 1.5 cm in diameter, their peduncles 3 to 4 mm long, 2-celled, 2-seeded.

LUZON, Province of Camarines, Mambulao, *For. Bur. 18734 Darling*, April 6, 1910, in forests, altitude about 100 m, locally known as *madadignay*.

A strongly characterized species, probably most closely allied to *Memecylon wightii* Thwaites of India and Ceylon.

ARALIACEÆ.

SCHEFFLERA Forst.

Schefflera brevipes sp. nov.

Glabra, inflorescentiis sparse puberulis exceptis; foliolis circiter 7, vel foliorum superiorum 3, oblongis, coriaceis, integris, apice subrotundatis, usque ad 20 longis; petiolo vix 1 cm longo; paniculis terminalibus, ramis racemoso-dispositis inferioribus usque ad 30 cm longis; umbellulis racemoso-dispositis, breviter pedunculatis, 8- ad 12-floris; floribus breviter pedicellatis, 5-meris.

A glabrous, erect or subscandent shrub. Branches rather stout, the ultimate ones about 1 cm in diameter, glabrous. Leaves alternate, the petioles stout, very short, on the material available none exceeding 1 cm in length, inflated and clasping at the base; leaflets about 7, in the uppermost leaves sometimes only 3, oblong, coriaceous, 15 to 20 cm long, 6.5 to 8 cm wide, entire, upper surface shining, the lower dull, the apex mostly broad and rounded, rarely broadly and obtusely acuminate, the base acute or somewhat decurrent-acuminate; lateral nerves about 20, distinct, anastomosing, not much more prominent than are the secondary ones and the primary reticulations; petiolules 5 to 8 cm long. Panicles terminal, the common rachis about 30 cm long, all parts slightly puberulent, becoming glabrous or nearly so, the branches alternate, spreading or ascending, the lower ones 30 cm long. Umbels numerous, mostly scattered, racemosely arranged along the primary branches, each with from 8 to 12 flowers, the peduncles 3 to 4 mm long, puberulent, the pedicels usually about 2 mm long. Flowers 5-merous. Calyx obconic, truncate, about 2 mm long and the same diameter at the apex. Petals 5.2 mm long, base 2 mm wide, cohering by their apices and falling as a whole. Stamens 5; filaments 2.5 mm long; anthers 1 mm long. Ovary 5-celled.

LUZON, Province of Isabela, Cabojan River, *For. Bur. 18545 Alvarez*, March 21, 1909.

A species well characterized by its oblong, coriaceous, ample, entire leaflets,

and especially by its very short petioles. Similar in some respects to *Schefflera clementis* Merr., of Mindanao, but with more slender branches which are not covered with bracts, differently shaped leaflets, and short petioles.

Schefflera leytensis sp. nov.

Glabra; foliis longe petiolatis, foliolis circiter 8, ellipticis vel oblongo-ellipticis, usque ad 14 cm longis, basi rotundatis, apice abrupte subcaudato-acuminatis, margine integris; floribus 5-meris, in umbellulis longe pedunculatis dispositis, umbellulis racemoso-dispositis; ovario 10-loculare.

Glabrous throughout. Stems unknown. Leaves long-petioled, the petioles at least 20 cm in length; leaflets about 8, elliptic or oblong-elliptic, coriaceous, glabrous, shining on both surfaces when dry, 10 to 14 cm long, 4.5 to 7 cm wide, entire, the margins reflexed, the apex abruptly subcaudate-acuminate, acumen 2 cm long or less, base rounded; nerves 10 to 12 on each side of the midrib, spreading, anastomosing, the reticulations lax; petiolules 4 to 5 cm long. Inflorescence (or partial inflorescence?) about 40 cm long, the rachis stout, dark-colored when dry, the umbels racemosely disposed, their peduncles about 4 cm long, about 30 on each inflorescence or branch. Flowers 5-merous, about 25 in each umbel, their pedicels 3 to 5 mm long. Calyx cup-shaped, 3 mm long, truncate. Petals 5, oblong-ovate, about 4 mm long, coherent by their apices and falling as a whole. Stamens 5; filaments 4 mm long; anthers 2 to 2.2 mm long. Ovary 10-celled; stigma conic, less than 1 mm long.

LEYTE, central divide, altitude about 1,150 m, *For. Bur. 16904 Rosenbluth*, February, 1909.

ERICACEÆ.

DIPLYCOSIA Blume.

Diplycosia parvifolia sp. nov.

Frutex parvus epiphyticus vix 1 m altus, ramulis junioribus plus minus setosis; foliis coriaceis, nitidis, ellipticis vel elliptico-oblongis, basi acutis, apice acutis vel leviter acuminatis, 1 ad 2.5 cm longis, subtus glanduloso-punctatis, nervis lateralibus obsoletis, basi interdum obscure triplinerviis; floribus paucis, axillaribus, solitariis, pedicellatis, calycis segmentis minute ciliatis.

A small, epiphytic, erect shrub less than 1 m high, diffusely branched, the branches slender, glabrous, brown, slightly striate, terete, the branchlets with scattered slender, brown, more or less appressed, setose hairs. Leaves coriaceous, elliptic to elliptic-oblong, 1 to 2.5 cm long, 1 cm wide or less, entire, the base acute, the apex acute or slightly acuminate, glabrous and shining when dry, but the margins of the younger leaves more or less ciliate-setose, the lower surface with scattered, dark-colored, small glands; midrib distinct, the lateral nerves and reticulations obsolete, the base sometimes very obscurely triplinerved; petioles about 2 mm long,

glabrous. Flowers axillary, solitary, few, their pedicels setose, up to 7 mm in length, the corolla unknown, basal bract minute, less than 1 mm long, the apex of the pedicel with two orbicular-ovate bracteoles about 1.5 mm in diameter. Calyx glabrous except the slightly ciliate margins of the lobes, accrescent, the lobes just after anthesis ovate, acuminate, about 2 mm long; style persistent, 2 mm long.

NEGROS, Canlaon Volcano, on mossy trunks in forests at an altitude of about 1,500 m, *Merrill 6995*, April, 1910.

A species well characterized by its comparatively small leaves, the lateral nerves obsolete except sometimes the very faint subbasal pair.

MYRSINACEÆ.

ARDISIA Sw.

Ardisia biflora sp. nov. § *Akosmos.*

Arbuscula glabra usque ad 3 m alta; foliis petiolatis, oblongis vel lanceolato-oblongis, integris, chartaceis, valde acuminatis, subtus valde glanduloso-punctatis, in sicco nitidis, pallidis; inflorescentiis axillaribus, solitariis, tenuibus, bifloris, quam folia multo brevioribus; sepalis petalisque valde glanduloso-punctatis.

A shrub 1 to 3 m high, glabrous; branches and branchlets slender, terete, gray or brownish. Leaves alternate, oblong to oblong-lanceolate, chartaceous, pale and shining when dry, entire, 4 to 8 cm long, 1 to 2.5 cm wide, the apex strongly acuminate, the base cuneate, the lower surface very strongly and densely glandular-punctate; nerves about 10 on each side of the midrib, not prominent, slender, anastomosing, the secondary ones nearly as prominent; petioles slender, about 5 mm long. Inflorescence axillary, solitary, slender, the peduncle 6 to 10 mm long, bearing at its apex two flowers, their pedicels 6 to 8 mm in length. Flowers greenish-white, tinged with pink, 5-merous, hermaphrodite. Sepals reniform-ovate, less than 1 mm long, united for the lower third, strongly glandular-punctate, scarcely overlapping, spreading, rounded, the margins minutely ciliate. Petals elliptic-ovate, acute, 3.5 to 4 mm long, prominently glandular-punctate throughout, the tube about 0.5 mm long. Anthers 2 mm long, oblong-ovoid, minutely apiculate, glandular on the back, the filaments very short. Ovary ovoid, apparently with few (one?) ovules; style 2 mm long. Fruit globose, glandular, about 5 mm in diameter.

LUZON, Province of Zambales, Mount Tapulao, in exposed ridge-forests, altitude about 1,400 m, *Bur. Sci. 5073 Ramos* (type), *For. Bur. 8110 Curran & Merritt*, December, 1907.

A species apparently belonging in the section *Akosmos*, strongly characterized by its slender, axillary, 2-flowered inflorescences; the apparently 1-ovuled ovary is suggestive of *Discocalyx*, but in all other characters the species is unmistakably an *Ardisia*.

Ardisia clementis Elm. Leafl. Philip. Bot. 2 (1910) 665. § *Tinopsis.*

Arbor vel arbuscula, inflorescentiis exceptis glabra; foliis ellipticooblongis vel elliptico-ovatis, chartaceis vel subcoriaceis, acuminatis, glandulis manifestis destitutis, nervis utrinque circiter 14, subtus prominentibus; paniculis terminalibus quam folia brevioribus, bipinnatim compositis; floribus brevissime racemosis vel subumbellatis; sepalis imbricatis, integris, rotundatis, margine cillatis.

A tree or shrub, glabrous except the inflorescence which is somewhat brown-pubescent or puberulent. Branches terete, gray or brownish. Leaves alternate, elliptic-oblong to elliptic-ovate, chartaceous or subcoriaceous, 11 to 25 cm long, 4 to 9 cm wide, entire, the apex acute or acuminate, the base cuneate, dull or slightly shining when dry; nerves about 14 on each side of the midrib, beneath distinct, anastomosing, the reticulations rather fine; petioles stout, about 1 cm long. Panicles terminal, about 10 cm long, the lower branches about 4 cm long, usually spreading, the upper ones shorter, each branch bearing from 5 to 7 flowers near the apex, subumbellately arranged or in a short raceme the pedicels about 1 cm long, slightly accrescent in fruit. Calyx about 5 mm in diameter, the lobes broadly ovate, rounded, overlapping to the right, glandular-punctate, margins ciliate, united for the lower one-third. Petals elliptic-ovate, obtuse, about 7 mm long, 5 mm wide, slightly glandular-punctate in the upper one-half, the tube about 1 mm long. Anthers narrowly ovoid, slightly apiculate, 4 mm long, the median portion of the back with few, rather large glands. Ovary glabrous; style about 4.5 mm long, not exserted in bud. Fruit globose, slightly longitudinally striate when dry, about 6 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 231, 889,* and *s. n.* (type), February, 1906, March, 1907, and January, 1907.

Ardisia confertiflora sp. nov. § *Tinus.*

Arbor parva, usque ad 5 m alta, glabra; foliis ut videtur plus minus succulentis, in sicco chartaceis vel submembranaceis, oblongo-obovatis, vel obovatis, apice rotundatis, basi cuneatis, nervis lateralibus obscuris; inflorescentiis axillaribus, racemosis, floribus in tertia superiore parte plus minus dense dispositis; sepalis glandulosis, emarginatis, margine minute ciliatis.

A small tree reaching a height of 5 m, glabrous. Branches and branchlets rather stout, terete, brownish. Leaves somewhat crowded on the younger branchlets, when fresh apparently somewhat thick and succulent, when dry chartaceous or submembranaceous, dull or slightly shining, obovate or narrowly obovate, 6 to 10 cm long, 2.5 to 5 cm long, entire, the apex broad, rounded, narrowed from the upper one-third or one-half to the cuneate base, the lower surface minutely puncticulate; nerves obscure, about 13 on each side of the midrib, very slender, some-

times nearly obsolete; petioles 5 mm long or less. Racemes in the upper axils, solitary, stout, 5 to 10 cm long, only the upper third flower-bearing, this portion of the rachis densely covered with scars and pedicels, the latter 1 to 2 cm long. Flowers pink or purplish, 5-merous, comparatively large. Calyx about 8 mm in diameter, the lobes united for the lower one-third or one-half, about 3 mm wide, elliptic-ovate or ovate, apex slightly emarginate, all parts densely glandular, the margins minutely ciliate. Corolla-tube about 2 mm long, the lobes ovate or broadly oblong-ovate, about 13 mm long, 7 mm wide, somewhat acuminate, the acumen obtuse, glandular-punctate. Anthers about 6.5 mm long, slightly apiculate-acuminate, with few large glands on the back, the cells not septate or rugose, the filaments about 2 mm long. Ovary ovoid; style about 1 cm long, obscurely glandular. Fruit globose or depressed-globose, about 8 mm in diameter, violet when mature, said to be edible.

BATANES ISLANDS, Batan, Santo Domingo de Basco, *Bur. Sci. 3589 Fénix* (type), *Bur. Sci. 3214, 3216 Mearns.* BABUYANES ISLANDS, Fuga, *Bur. Sci. 3245 Mearns.*

This species is manifestly allied to *Ardisia humilis* Vahl, *A. boissieri* A. DC., and *A. littoralis* Andr., but is at once distinguishable from all by its racemosely disposed flowers, these being crowded along the upper one-third of the racemes and not umbellately arranged at the ends of the branches. Other distinguishing characters are its comparatively large flowers and its emarginate sepals. The material on which the above species is based, was previously referred by me to *Ardisia humilis* Vahl.[3] Local name *pain.*

Ardisia curranii sp. nov. § *Tinopsis.*

Arbor glabra, circiter 15 m alta; foliis pseudoverticillatis, coriaceis, oblongis vel late oblongo-lanceolatis, breviter acuminatis, nervis numcrosis, patulis, vix distinctis; paniculis terminalibus, quam folia multo longioribus; sepalis pubescentibus, punctatis, margine ciliatis; ovario puberulo.

A glabrous tree about 15 m high. Branches terete, striate, light-gray, rather stout. Leaves alternate, somewhat pseudo-verticillately crowded at the apices of the branchlets, oblong to broadly oblong-lanceolate, coriaceous, brown when dry, entire, 15 to 20 cm long, 5 to 7 cm wide, dull or slightly shining, the apex shortly and broadly acuminate, the base somewhat decurrent-acuminate, scarcely glandular-punctate, or very minutely and obscurely so; nerves 25 to 30 on each side of the midrib, obscure, spreading, scarcely anastomosing, the reticulations obsolete; petioles 2.5 to 3 cm long. Panicles terminal, about 30 cm long, somewhat narrowly pyramidal, the lower branches 15 cm in length, the flowers racemosely disposed on the ultimate branchlets, their pedicels 1 to 2 cm long. Calyx about 4.5 mm in diameter, ferruginous-pubescent outside,

[3] *This Journal* 3 (1908) *Botany* 425.

glabrous within, the lobes ovate, rounded, united for about one-half their length, their margins ciliate, glandular-punctate. Petals ovate, 7 to 8 mm long, about 4 mm wide, glabrous, glandular-punctate, acuminate, the tube short. Anthers lanceolate-ovoid, 5 mm long, the apex long-apiculate-acuminate, the median portion of the back distinctly glandular, the filaments very short. Ovary ovoid, minutely ferruginous-puberulent; style about 4 mm long. Fruit globose or depressed-globose, 6 to 7 mm in diameter, glabrous, minutely apiculate.

LUZON, Province of Camarines, near Lupi, in forests, altitude about 100 m, *For. Bur. 10760 Curran*, July 11, 1908.

Ardisia darlingii sp. nov. § *Tinopsis.*

Arbor glabra circiter 20 m alta; foliis oblongis vel anguste oblongo-obovatis, chartaceis vel subcoriaceis, nitidis, minutissime obscureque puncticulatis, apice rotundatis, obtusis vel obscure late acuminatis, basi cuneatis, margine recurvatis; inflorescentiis terminalibus axillaribusque, corymboso-paniculatis; sepalis glandulosis, margine ciliato-pubescentibus.

A tree about 20 m high, glabrous. Branches terete, grayish-brown, rather stout. Leaves alternate, somewhat crowded on the younger branchlets, oblong or narrowly oblong-obovate, entire, 7 to 11 cm long, 1.5 to 3.5 cm wide, shining, chartaceous or subcoriaceous, the apex rounded, obtuse, or broadly and obscurely acuminate, narrowed from about the middle to the cuneate base, the margins recurved, the lower surface very minutely and obscurely glandular-puncticulate; nerves about 15 on each side of the midrib, not prominent, obscurely anastomosing, the reticulations lax, obscure or subobsolete; petioles about 1 cm long. Inflorescence terminal and in the upper axils, corymbose-paniculate 10 cm long or less, the lower branches of the terminal panicles about 5 cm long, the upper ones shorter, each branch bearing at its apex a congested raceme or umbel of from 5 to 10 flowers, the pedicels unequal in length, each subtended by an oblong or oblong-ovate, obtuse bracteole about 3.5 mm long, 2 mm wide, the pedicels 3 to 12 mm long. Sepals elliptic-ovate, about 3 mm long, 2.5 mm wide, rounded, entire, slightly united at the base, overlapping, distinctly glandular-punctate with small reddish glands, the margins ciliate-pubescent. Petals about 4.5 mm long, 3 mm wide, free or nearly so, acute or obscurely acuminate, obscurely glandular-punctate. Anthers oblong-ovate, apiculate-acuminate, 2.5 mm long, obscurely glandular on the back, the filaments very short. Ovary glabrous; style 2 mm long.

LUZON, Province of Abra, near Bacog, in mountain forests, altitude about 1,800 m, *For. Bur. 14611 Darling*, February 9, 1909 (type); Tue, altitude about 1,300 m, *For. Bur. 14601 Darling.*

Somewhat remotely allied to *Ardisia lanceolata* Roxb., but very different from that species.

Ardisia diffusa sp. nov. § *Acrardisia.*

Arbuscula vel arbor glabra; foliis chartaceis vel subcoriaceis, acuminatis, brevissime petiolatis, integris, subtus prominente verrucoso-glandulosis; paniculis terminalibus, amplis, diffusis, quam folia multo longioribus, pyramidatis; floribus umbellulatis, longissime pedicellatis, 5-meris, sepalis petalisque glandulosis.

An erect, glabrous shrub or tree, the branches terete, reddish-brown. Leaves alternate, scattered, elliptic-oblong, chartaceous or subcoriaceous, brown and somewhat shining when dry, entire, 7 to 9 cm long, 3 to 5 cm wide, the apex shortly and sharply acuminate, the base acute, the lower surface with numerous, scattered, verrucose glands; nerves 15 to 20 on each side of the midrib, not prominent, anastomosing, the reticulations lax; petiole stout, 2 to 3 mm long. Panicles terminal, pyramidal, reaching a length of 20 cm, the branches alternate, spreading, the lower ones 9 cm long, the upper ones gradually shorter, the secondary branches slender, 1.5 to 2.5 cm long, racemosely arranged on the primary ones, each bearing at its apex from 3 to 7 long-pedicelled, umbellately arranged flowers, the pedicels slender, 1 to 2 cm long. Calyx about 4 mm in diameter, the lobes 5, oblong or oblong-ovate, obtuse, entire, about 1.6 mm long, somewhat united at the base, spreading in anthesis, not at all imbricate, prominently glandular-punctate with large glands, the margins ciliate. Petals oblong-ovate, 6 to 7 mm long, about 3 mm wide, united for about the lower 1.5 mm, the apex prominently acuminate, with few large, scattered glands in the upper one-half. Anthers 4.5 mm long, prominently acuminate, cordate at the base, with few glands along the median portion of the back, the filaments 1.5 to 2 mm long. Ovary ovoid, glabrous; style about 5 mm long.

MINDANAO, Province of Misamis, Calagan, on the route to Mount Malindang, *For. Bur. 4759 Mearns & Hutchinson*, May, 1906.

A species most closely allied to *Ardisia gardneri*, *A. divergens*, and *A. ceylanica*, but abundantly distinct from all. It is well characterized by its ample, pyramidal, rather lax panicles, long-peduncled umbels and long-pedicelled flowers.

Ardisia lanceolata Roxb. Hort. Beng. (1814) 85, nomen nudum, Fl. Ind. ed. Carey & Wall. 2 (1824) 275, ed. Carey 1 (1832) 583; Mez in Engl. Pflanzenreich 9 (1902) 122.

Ardisia purpurea Reinw. in Bl. Bijdr. (1826) 684.

MINDANAO, District of Zamboanga, Tetuan, *Ahern 596.*

Not previously reported from the Philippines; Malay Peninsula, Java, Sumatra, Borneo, and Celebes.

Ardisia littoralis Andr. Repos. 10 (1811) *t. 630;* Gamble in Journ. As. Soc. Beng. 74[2] (1905), Extra Number, 135.

Ardisia humilis Mez in Engl. Pflanzenreich 9 (1902) 127, *fig. 20, A–E,* not of Vahl, or in part only.

LUBANG, *Merrill 968.* SEMERARA, *Merrill 4160.*

This species is apparently a coast shrub only, from 1 to 3 or 4 m in height. Mr. Gamble has kindly supplied me the following additional information regard-

ing the separation of this form from *Ardisia humilis:* "*Ardisia humilis* Vahl is a Ceylon coast shrub which is endemic there and does not extend to the Malay Peninsula. The figures A–E on page 128 of Mez's monograph are *Climacandra obovata*=*Ardisia littoralis* Andr. which has septate anthers, which *A. humilis* has not. The authors of the "Flora of British India" have mixed up *A. humilis* and *A. solanacea* Roxb., which is quite a different plant, almost a tree and of inland forests, and Mez has correctly separated them, but he has incorrectly put together *A. humilis* Vahl and *A. littoralis* Andr."

Ardisia littoralis Andr. is apparently rare in the Philippines, but we have several very closely allied forms, at least one of which is abundant and widely distributed in the Archipelago.

Malay Peninsula and Archipelago, southern China, and the Philippines.

Ardisia boissieri A. DC. in DC. Prodr. **8** (1844) 129; Mez in Engl. Pflanzenreich **9** (1902) 129.

This species is very common and widely distributed in the Philippines, extending from northern Luzon to southern Mindanao, a tree of the hill forests at low and medium altitudes ascending to at least 600 m in some localities; it reaches a height of 15 m in some regions, and is not a seacoast plant. It is very similar in all superficial characters to *A. littoralis* Andr., but can usually be at once distinguished by its anthers being prominently glandular on the back, and not transversely septate. What I take to represent this species comprises about 80 specimens in this herbarium, from all parts of the Philippines, which have, for most part, been identified as *Ardisia humilis* Vahl, many of them so named by Doctor Mez. It is very probable that some of the extra-Philippine specimens cited by Mez under *Ardisia humilis,* should be referred to *A. boissieri,* and it is likewise very probable that this name will not prove to be the oldest one.

Ardisia pirifolia Mez l. c. 129.

This species, the type of which I have examined in the Berlin Herbarium, is distinguishable from *A. boissieri* only by the most trivial characters; in all respects except in having the sepals minutely emarginate, it is quite the same as *A. boissieri.* The type was from Polillo, not from Luzon, and the species is represented by *Bur. Sci. 9292 Robinson,* from the same island, *Merrill 1101,* from Baler, Province of Tayabas, Luzon, and apparently also by *Elmer 5645* from the Province of Union, Luzon, the latter so identified by Doctor Mez. The sepals are not always glabrous, but are usually more or less ciliate on the margins; the only character left for specific separation of this form from *A. boissieri* is the very trivial one of the emarginate (very slightly) sepals.

Ardisia verrucosa Presl Rel. Haenk. **2** (1835) 65; Mez l. c. 134.

This species is also manifestly closely allied to, and perhaps not specifically distinct from *Ardisia boissieri* A. DC. Mez distinguishes it especially by its 2-flowered umbels, but Presl describes it as having from 2- to 5-flowered umbels, and one of the original specimens, in the Prague Herbarium, which I have examined, shows at least 5 flowers. Doctor Mez examined the specimen of the original collection preserved in the Vienna Herbarium.

Ardisia macgregorii sp. nov. § *Tinus.*

Arbuscula glabra, circiter 1 m alta; foliis lanceolatis, obtusis, coriaceis, subtus minute dense puncticulatis, nervis reticulisque densis, obscuris; inflorescentiis axillaribus, solitariis, simplicibus, fructibus subumbellatim dispositis.

A glabrous shrub about 1 m high. Branches terete, brown, glabrous. Leaves coriaceous, brown and somewhat shining when dry, lanceolate, 8 to 10 cm long, 1 to 1.5 cm wide, gradually narrowed at both ends, the apex blunt, the base cuneate, the margins entire, somewhat recurved, the lower surface minutely and densely puncticulate; nerves numerous, obscure, densely disposed, the reticulations also obscure; petioles 1 cm long or less. Inflorescence axillary, solitary, much shorter than the leaves, the peduncles about 2 cm long. Flowers unknown. Fruits umbellately disposed at the apices of the peduncles, their pedicels 1 to 1.5 cm long, 4 or 5 at the apex of each peduncle. Persistent calyx about 5 mm in diameter, the lobes ovate, rounded, glabrous or nearly so, glandular-punctate, united for about one-half their length. Fruit globose, about 5 mm in diameter.

CEBU, near Toledo, *Bur. Sci. 1722 McGregor*, October 28, 1906.

A species manifestly allied to *Ardisia humilis* Vahl, and *A. boissieri* A. DC. distinguishable by its narrow, lanceolate leaves.

Ardisia mindorensis sp. nov. § *Pyrgus.*

Species A. grandidenti Mez similis, sed differt petiolo multo breviori, dentibus minoribus, a A. serrata (Cav.) A. DC. differt inflorescentiis plus minus dense ferrugineo-tomentosis, foliis subtus parce pubescentibus.

A shrub 3 to 5 m high. Branches terete, brown or grayish, striate, usually rather thick, glabrous, the branchlets often ferruginous-pubescent. Leaves pseudo-verticillately crowded at the apices of the branchlets, subtending the terminal panicles, elliptic-ovate to elliptic-lanceolate, chartaceous, 9 to 18 cm long, 3 to 6 cm wide, gradually narrowed towards both ends, the base acute, rarely somewhat obtuse, the apex rather prominently acuminate, margins distinctly and irregularly serrate-dentate, the teeth rather small, the upper surface glabrous and shining, or the midrib and nerves slightly puberulent, beneath also shining and distinctly ferruginous-tomentose on the midrib and primary nerves, obscurely glandular-punctate; nerves 12 to 15 on each side of the midrib, elevated and very prominent on the lower surface, curved-ascending, anastomosing, the reticulations rather distinct; petioles 3 to 7 mm long, ferruginous-tomentose, ultimately nearly glabrous. Panicles terminal, pyramidal, 6 to 13 cm long, the rachis, branches and branchlets densely ferruginous-tomentose, the primary branches spreading, the lower ones often 5 cm long, the upper ones shorter, the secondary branches mostly in the upper half of the primary ones, each bearing from 5 to 7 flowers arranged in a condensed raceme or subumbellate, the pedicels ferruginous-tomentose, 9 to 12 mm long. Calyx-lobes broadly triangular-ovate, acute, about 1.5 mm long and wide, imbricate, pubescent, the margins prominently ciliate, glandular-punctate. Petals ovate, 5 mm long, 3 mm wide, acute or

obscurely acuminate, with few, scattered, comparatively large glands. Anthers 2.5 mm long, apiculate, not glandular. Ovary ovoid, ferruginous-puberulent; style about 5 mm long. Fruit globose, black-purple when mature, somewhat fleshy, about 7 mm in diameter.

MINDORO, Mount Halcon, in forests, altitude about 1,800 m, *Merrill 5675, 5732, 6145* (type), November, 1906, *For. Bur. 4342 Merritt;* Mount Irauan, *For. Bur. 8728 Merritt,* January, 1908, altitude about 1,300 m; Mount Sablayan, *For. Bur. 11012 Merritt,* March, 1908, altitude about 970 m; mountains back of Abra de Ilog, *For. Bur. 8793 Merritt,* January, 1908, altitude 500 m.

As noted above, this species is closely allied to *Ardisia grossedentata* Mez, differing in its much shorter petioles. It bears much the same relationship to that species as does *A. curtipes* Merr. to *A. serrata* (Cav.) A. DC. It is distinguished from *H. serrata* var. *brevipetiolata* Merr. by its ferruginous tomentum and differently shaped leaf-bases.

Ardisia oblongifolia sp. nov. § *Stylardisia.*

Arbor vel frutex erecta, ramulis, foliis junioribus subtus, inflorescentiisque minute brunneo-puberulis; foliis oblongis vel oblongo-lanceolatis, chartaceis, acuminatis, petiolatis, alternis; paniculis terminalibus, quam folia brevioribus, ramis divaricatis, paucis.

An erect shrub or tree. Branches terete, light-gray or brownish, the younger ones brown-puberulent. Leaves alternate, scattered, oblong to oblong-lanceolate, 11 to 18 cm long, 2.5 to 5 cm wide, chartaceous, entire, dull or slightly shining when dry, the apex rather gradually and sharply acuminate, the base acute, beneath, when young, somewhat ferruginous-puberulent becoming glabrous, not manifestly glandular-punctate; nerves up to 18 on each side of the midrib, not very prominent, often obscure; petioles 5 to 7 mm long. Panicles terminal, pyramidal, 10 cm long or less, the branches few, alternate, divaricately spreading, the lower ones 3 to 4 cm long, the rachis, branches and branchlets puberulent with dark-brown hairs. Flowers subumbellately disposed, the umbels peduncled and racemosely arranged on the primary panicle-branches, the peduncles about 5 mm long, sometimes less, the pedicels slender, 2 to 3 mm long. Calyx about 3 mm in diameter, the five lobes ovate, obtuse, about 1.5 mm long, glandular-punctate, the margins minutely puberulent. Petals ovate, nearly free, acute, 3.5 mm long, 2.5 mm wide, not at all glandular-punctate. Anthers 3 mm long, not glandular. Ovary glabrous; style 3.5 to 5 mm long, often exserted before anthesis.

MINDANAO, Lake Lanao, *Mrs. Clemens 779* (type), from between Malabang and Camp Keithley, November, 1906, and three sheets without number from Camp Keithley.

Most of the flowers do not have the styles exserted, but a few of them on the type specimen have the styles decidedly exserted, hence the species is placed in the § *Stylardisia.* In might, with almost equal propriety, be placed in the § *Akosmos.*

Ardisia palawanensis sp. nov. § *Pyrgus.*

Arbuscula circiter 1.5 m alta; foliis petiolatis, oblongo-oblanceolatis vel late oblongo-lanceolatis, chartaceis, irregulariter serratis, subtus ad costa plus minus pubescentibus, valde glanduloso-punctatis; floribus 5-meris, sepalis petalisque ferrugineo-villosis, plus minus punctatis; ovario villoso.

A shrub about 1.5 m high. Branches terete, brownish, pubescent. Leaves pseudo-verticillate at the nodes and subtending the inflorescence, normal leaves also subtending each, or most of the panicle-branches, oblong-oblanceolate or broadly oblong-lanceolate, chartaceous, shining when dry, 14 to 20 cm long, 3.5 to 7 cm wide, somewhat pubescent on the midrib on both surfaces, the apex obscurely and bluntly acuminate, the base gradually narrowed, cuneate, margins entire near the base, in the upper one-half or two-thirds irregularly serrate, the under surface distinctly and rather densely glandular-punctate; nerves 9 to 12 on each side of the midrib, beneath very distinct, anastomosing; petioles pubescent, 1 cm long or less. Inflorescence terminal, subtended by a whorl of leaves, the rachis about 15 cm long, and with the branches and pedicels more or less densely brown-pubescent, the branches alternate, spreading, simple, most of them subtended by a normal leaf, the lower ones 6 cm long, the upper gradually shorter, each bearing at the somewhat swollen apex from 2 to 5 subumbellately disposed flowers, and with numerous scars of fallen pedicels, each flower subtended by an oblong, pubescent bracteole about 5 mm in length. Pedicels about 1.5 cm long, ferruginous-villous. Sepals 5, broadly ovate, acute or shortly acuminate, about 5 mm long, 3.5 mm wide, accrescent and 6 to 7 mm in length, densely ferruginous-villous, margins strongly villous-ciliate, glandular-punctate. Petals nearly free, elliptic-ovate, about 6 mm long, 4 mm wide, obtuse, slightly pubescent, glandular only in the median part of the upper one-half. Anthers 3.5 mm long, not glandular, apiculate-acuminate, their filaments nearly 2 mm long. Ovary globose, ferruginous-pubescent; style glabrous, 5 mm long. Immature fruits globose, somewhat ferruginous-pubescent, inclosed by the somewhat accrescent calyx-lobes.

PALAWAN, about 3 miles northeast of Puerto Princesa, *For. Bur. 3518 Curran*, January 19, 1906, an undershrub in flat forests.

As species undoubtedly belonging in the section *Pyrgus* in spite of the normal leaves subtending the panicle-branches, the whole inflorescence subtended by a whorl of leaves. It is apparently most closely allied to *Ardisia grandidens* Mez, but is very different from that species. The ferruginous-pubescent or villous panicles, pedicels, sepals, petals, and immature fruits are characteristic.

Ardisia reptans sp. nov. § *Bladhia.*

Suffruticosa, caulis reptans, ramulis foliiferis erectis vel ascendentibus, brevibus, densissime ferrugineo-tomentosis; foliis ternato-pseudoverticillatis, ellipticis vel ovato-ellipticis, membranaceis, acutis vel obtusis, basi rotundatis, obscure punctatis, margine prominente distanter serrulatis,

nervis utrinque circiter 5, subtus prominentibus; inflorescentiis axillaribus, solitariis, tenuibus, paucifloris, foliis subaequalibus vel brevioribus.

A suffrutescent plant, the stems creeping or prostrate, rooting, striate, glabrous or nearly so, slender, brown, the erect leaf-bearing branches densely pubescent with dark-brown, crisped hairs, these branches less than 20 cm high, often some roots appearing above the lowermost leaves. Leaves pseudo-verticillate, in threes, their petioles 5 mm long or less, densely crisped-tomentose, the lamina membranaceous, elliptic or elliptic-ovate, 3 to 4 cm long, 1.5 to 2.5 cm wide, with scattered, crisped, brown hairs on both surfaces, especially on the midrib and nerves, obscurely glandular, the apex acute or obtuse, base rounded, margins prominently and rather distantly denticulate; nerves about 5 on each side of the midrib, prominent beneath, obscurely anastomosing, the reticulations lax, obscure. Flowers unknown. Infrutescence axillary, solitary, very slender, brown-puberulent, with intermixed longer crisped hairs, the rachis 2 to 2.5 cm long, bearing near its apex few long-pedicelled fruits, the pedicels about 1 cm long, puberulent, each subtended by a narrowly lanceolate or linear, acuminate, 2.5 mm long bracteole. Sepals persistent, reflexed in fruit, lanceolate, gradually narrowed upward to the acuminate apex, about 3 mm long, united for the lower 0.5 mm, more or less brown-puberulent, margins obscurely ciliate, very obscurely glandular-punctate. Fruit fleshy, globose, 5 to 6 mm in diameter, red, glabrous, tipped with the slender, 3 mm long, persistent style; seed globose, 4 mm in diameter.

LUZON, Province of Pampanga, Mount Abu, *Bur. Sci. 1933 Foxworthy*, December 31, 1906, in forested ravines, altitude about 1,360 m.

A species of the section *Bladhia*, and apparently closely allied to *Ardisia pusilla* A. DC. (*A. villosa* Mez, non Roxb.) of Japan, and to *A. faberi* Hemsl. of China. All other species of the section, with one exception, *A. metallica* N. E. Br., of Sumatra, are confined to the Himalayan region, China, and Japan.

DISCOCALYX Mez.

Discocalyx insignis sp. nov.

Frutex glaber circiter 3 m altus; foliis alternis, vix pseudo-verticillatis, elliptico-oblongis, usque ad 40 cm longis, margine dense denticulatis, basi longe decurrento-acuminatis; petiolo 6 ad 9 cm longo; floribus dioicis, 5-meris, glabris.

An erect glabrous shrub about 3 m high, the ultimate branchlets stout, about 1 cm in diameter. Leaves alternate, not pseudo-verticillate, elliptic-oblong, 35 to 40 cm long, 10 to 14 cm wide, chartaceous or subcoriaceous, usually grayish when dry, shining, not glandular-punctate, the apex shortly and obscurely blunt-acuminate, the base long-decurrent-acuminate, the margins entire in the lower part of the leaf, but above the lower one-fourth densely denticulate; nerves about 20 on each side of the midrib, prominent, anastomosing, the reticulations distinct, rather lax; petiole stout, 6 to 9 cm long. Panicles fascicled at the ends of

special branches, these branches simple or branched near their apices, up to 18 cm long, the apical portions thickened, cylindric, marked by numerous scars, the panicles numerous, entirely glabrous, slender, 5 to 8 cm long, all parts marked with linear or punctate glands, the panicles 2-pinnate, the flowers racemosely arranged on the ultimate branchlets. Staminate flowers 5-merous, their pedicels 2 to 3 mm long. Calyx 1.6 mm in diameter, glandular-punctate, glabrous, the lobes ovate, obtuse, united for one-half their length. Corolla 3 mm in diameter, glandular-punctate, the lobes ovate, obtuse, united for one-half their length. Anthers less than 0.5 mm long, sessile. Rudimentary ovary wanting. Pistillate flowers and fruits unknown.

MINDANAO, Province of Surigao, in the valley of the Agusan River near Amparo, in forests at an altitude of about 130 m, *For. Bur. 7616 Hutchinson*, August 26, 1907 (type). NEGROS, Mount Marapara, *For. Bur. 13688 Curran*, with immature flowers.

A species similar in vegetative characters to *Discocalyx effusa* Mez, but with very much larger leaves and much longer petioles, the inflorescence also entirely different. It is apparently most closely allied to *D. montana* Elm., but is quite distinct from that species.

Discocalyx macrophylla sp. nov.

Frutex erectus, glaber, circiter 2 m altus; foliis alternis, elliptico-ovatis vel elliptico-oblongis, subcoriaceis, in sicco nitidis, usque ad 31 cm longis, valde denticulatis, basi rotundatis, petiolo usque ad 15 cm longo; floribus in paniculis brevibus congestis, 5-meris, glabris.

An erect shrub about 2 m high, the ultimate branches very stout, brown, 1.5 to 2 cm in diameter. Leaves alternate, or somewhat crowded at the apices of the branchlets, elliptic-ovate to elliptic-oblong, about 30 cm long, 12 to 16 cm wide, glabrous, subcoriaceous, shining, the lower surface obscurely and minutely glandular-punctate, somewhat paler than the upper one, the apex very shortly and obscurely blunt-acuminate, the base broad, rounded, the margins strongly and densely denticulate except at the very base where they are entire; nerves 25 to 30 on each side of the midrib, very prominent, anastomosing, the reticulations distinct on both surfaces; petioles stout, dark-brown, about 15 cm long. Inflorescence on special, leafless (or with one very much reduced leaf) branches, 40 cm long or less, from just below the leaves, the apex thickened and bearing one or several short, dense panicles which doubtless become more or less diffuse in anthesis. Flowers (in bud, and immature), 5-merous, all parts glandular-punctate, glabrous, the anthers sessile. Immature fruit globose, 3 mm in diameter.

LUZON, Province of Cagayan, near San Vicente, in forests, at sea level, *For. Bur. 17237 Curran*, March 8, 1909.

A very characteristic species, distinguishable by its very large and long-petioled leaves, as well as by the very long, specialized branches that bear the inflorescences. It is unquestionably allied to *Discocalyx effusa* Mez, although quite different from

that species, and even more closely allied to *D. insignis* Merr., differing from the latter especially in its differently shaped leaves, which are broad and rounded at the base, not decurrent-acuminate, its much longer petioles, and more numerous leaf-veins.

EMBELIA Burm.

1. **Embelia coriacea** Wall. Cat. (1829) no. 2314; A. DC. Prodr. **8** (1844) 87; Mez in Engl. Pflanzenreich **9** (1902) 313.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 671, 1069*, and three sheets without number, September-October, 1906, 1907. The specimens agree perfectly with *Maingay 1018*, and with *5056 Dr. King's Collector*, from the Malay Peninsula, in our herbarium.

Penang and Malacca, Sumatra, Java, and Borneo; not previously reported from the Philippines.

OLEACEÆ.

JASMINUM Linn.

Jasminum cumingii sp. nov.

Frutex ut videtur scandens, glaber, inflorescentiis obscure puberulis exceptis; foliis oppositis unifoliolatis, ovatis, acuminatis, nitidis, basi late rotundatis, nervis utrinque 5 vel 6; inflorescentiis axillaribus, longe pedunculatis, 5-floris; calycis lobis 4 vel 5, subulatis, corollae lobis 6, oblongo-lanceolatis, acuminatis, quam tubus paullo brevioribus.

A shrub, apparently scandent, glabrous throughout except the obscurely puberulent inflorescence. Branches terete, brown, smooth. Leaves simple, opposite, ovate, 7 to 11 cm long, 4 to 7 cm wide, membranaceous, brown and shining when dry, the base broad, rounded, the apex rather sharply acuminate; nerves 5 or 6 on each side of the midrib, distinct, anastomosing, the reticulations very lax; petiole about 1.5 cm long, jointed. Cymes axillary, solitary, the peduncles rather slender, 3 to 7 cm long, each with 5 flowers near the apex, rarely with an additional pair of flowers at about the middle of the peduncle, the bracteoles setaceous, 3 to 5 mm long, the pedicels about 3 mm long. Calyx cup-shaped, about 4 mm long, 2.5 mm in diameter, slightly puberulent, with 4 or 5 setaceous, slender, 0.5 to 0.8 mm long teeth. Corolla-tube 1.5 cm long, the lobes 6, narrowly oblong or oblong-lanceolate, acuminate, about 12 mm long, 2.5 to 2.8 mm wide. Anthers 4 mm long. Style 11 mm long.

PHILIPPINES, without definite locality, *Cuming 1565*.

A species well characterized by its long-peduncled, axillary, solitary, few-flowered, slightly puberulent inflorescence, the corolla-lobes nearly as long as the corolla-tube. The form has not been rediscovered as yet in the Philippines.

Jasminum triplinervium sp. nov.

Frutex scandens glaber; foliis oppositis, simplicibus, chartaceis, oblongo-lanceolatis vel anguste oblongo-ovatis, usque ad 15 cm longis, apice rotundatis vel obtusis, rariter acutis, basi tenuiter triplinerviis;

inflorescentiis axillaribus, solitariis, pedunculatis, multifloris, foliis subaequilongis; calycis lobis 4 vel 5, setaceis, brevibus, corollae laciniis 5, ellipticis, rotundatis, quam tubus dimidio brevioribus.

A scandent glabrous shrub. Branches slender, terete, gray. Leaves opposite, simple, chartaceous, shining when dry and paler on the under surface, oblong-lanceolate to narrowly oblong-ovate, 12 to 15 cm long, 4 to 6 cm wide, the base acute, the apex narrowed, rounded, obtuse, or rarely acute, the base with a pair of slender lateral nerves leaving the midrib shortly above the insertion of the petiole, reaching at least to the middle of the leaf and anastomosing with the lateral nerves, these primary lateral nerves usually 5 or 6 pairs, distant, not prominent, scarcely more distinct than are the secondary ones; petioles jointed, 1.5 cm long. Cymes in the upper axils, solitary, about as long as the leaves, many-flowered, the peduncles about 5 cm long, the branches bearing from two to five flowers, the bracts and bracteoles minute, setaceous, 1 to 2 mm long. Pedicels 8 to 10 mm long. Calyx cup-shaped, glabrous, the tube 3 to 4 mm long, the teeth 4 or 5, unequal, 1 to 2.5 mm long, linear-lanceolate, acuminate, minutely scaberulous. Corolla white, the tube 2.4 cm long, the lobes 5, elliptic or oblong-elliptic, about 12 mm long, 8 mm wide, rounded at the apex, the base broad and minutely biauriculate. Anthers 6 to 7 mm long, acuminate.

NEGROS, Faraon, *For. Bur. 13557 Meyer & Foxworthy*, September 10, 1909, in forests, altitude not given.

A species well characterized by its slenderly triplinerved leaves, and its comparatively large flowers. There are from 20 to 25 flowers in each inflorescence.

APOCYNACEÆ.

ALSTONIA R. Br.

Alstonia paucinervia sp. nov.

Arbor glabra circiter 15 m alta; foliis chartaceis vel subcoriaceis, anguste oblongo-obovatis, usque ad 13 cm longis, basi angustatis, acutis, apice breviter latissime acuminatis vel obtusis, nervis utrinque circiter 15, patulis, conspicuis, distantibus; folliculis 20 ad 40 cm longis.

A glabrous tree about 15 m high. Ultimate branches terete, or the tips somewhat 4-angled, smooth, olivaceous. Leaves usually in whorls of 4, narrowly oblong-obovate, chartaceous or subcoriaceous, 9 to 13 cm long, 3.5 to 5 cm wide, the upper surface smooth and shining, the lower surface of about the same color but dull or very slightly shining, the apex very broadly and shortly acuminate or obtuse, gradually narrowed from about the middle to the acute base; nerves about 15 on each side of the midrib, spreading, distant, prominent, anastomosing close to the margin and forming a faint, somewhat looped, submarginal nerve, the reticulations lax, rather indistinct; petioles 1 to 1.5 cm long. Flowers unknown. Fruiting peduncles from the apical axils, 3 to 4 cm long,

simple or dichotomously branched at the apex, each bearing from 2 to 6 follicles. Follicles cylindric, glabrous, longitudinally striate, about 3 mm in diameter, 20 to 40 cm long, pendulous. Seeds flattened, oblong, 6 mm long, 1.5 mm wide, covered with short, brown hairs, both ends with numerous, long, brown hairs 7 mm in length or less.

LUZON, Province of Camarines, Paracale, *For. Bur. 18726 Darling*, March 19, 1910, in forests at an altitude of about 70 m, locally known as *batino*.

A species closely allied to *Alstonia macrophylla* Wall., but with smaller, somewhat differently shaped leaves which have fewer lateral nerves.

CONVOLVULACEÆ.

DICHONDRA Forst.

Dichondra repens Forst. Char. Gen. Pl. (1776) 39, *t. 20;* DC. Prodr. 9 (1855) 451.

Sibthorpia evolvulacea Linn. f. Suppl. (1781) 288.

Dichondra evolvulacea Britton in Mem. Torr. Bot. Club. 5 (1894) 268.

LUZON, District of Bontoc, Bauco, dry hillsides, altitude about 1,300 m, *Father M. Vanoverbergh 19*, January, 1910, locally known to the Ilocanos as *napalapayag*.

The genus is new to the Philippines, the present species being widely distributed in tropical, subtropical and subtemperate regions of the world.

VERBENACEÆ.

PYGMAEOPREMNA gen. nov.

Calyx parvus, anguste campanulatus sub anthesi regulariter 5-dentatus, sub fructu auctus, 2-lobatus, lobo altero 2-dentato, altero 3-dentato. Corollae tubus brevis, cylindraceus, rectus, breviter exsertus; limbus distincte 2-labiatus, lobo minore exteriore, integro, lobo majore interiore, 3-lobato, fauce intus parce villoso. Stamina 4, subaequalia, tubo affixa, quam corolla breviora; antherae ovatae, loculis parallelis vix divergentibus. Ovarium 2-loculare, loculis 2-ovulatis; stylus apice brevissime 2-fidus. Drupa parva, calyce insidens, obovoidea, excentrica, exocarpio carnoso, tenui, endocarpio duro, indiviso, saepissime 1-loculare vel rarius obscure 2-loculare. Semina oblonga, compressa, exalbuminosa. Suffruticosa, parva, erecta, parce ramosa, sparse pubescens. Folia opposita, simplicia, integra. Cymae parvae, breves, terminales vel in axillis superioribus pedunculatae. Flores parvi, albi vel virido-albi.

Pygmaeopremna humilis sp. nov.

Suffrutex erectus, usque ad 15 cm altus; foliis obovato-oblongis, oppositis, breviter petiolatis, membranaceis vel subchartaceis, acutis vel brevissime acuminatis, integris, basi acutis, subtus pallidioribus, nervis utrinque circiter 6, distantibus, distinctis; inflorescentiis terminalibus axillaribusque, usque ad 2 cm longis, puberulis; floribus parvis, circiter 4.5 mm longis.

An erect somewhat woody plant about 15 cm high, from stout, elongated, woody roots, the stems simple or dichotomously once branched, terete, slender, the branchlets pale or dark in color, puberulent. Leaves obovate-oblong, 8 to 12 cm long, 3 to 5 cm wide, membranaceous or subchartaceous, entire, the apex acute or very shortly acuminate, rather gradually narrowed from about the upper third to the acute base, the upper surface shining, with very few, scattered, short hairs, becoming glabrous or nearly so, the lower surface paler, eglandular, often shining, sometimes somewhat puberulent on the nerves; nerves about 6 on each side of the midrib, distant, distinct, anastomosing, the reticulations lax; petioles 2 to 4 mm long, puberulent. Inflorescence cymose, rather densely puberulent, terminating the stems and branches, or in the dichotomously branched plants terminating the main stem between the branches and also frequently terminating the branches, pedunculate, the peduncles about 1 cm long, the cymes in anthesis about 1 cm long and wide, somewhat larger in fruit, rather densely flowered, the pedicels about 2 mm long, subtended by small bracteoles. Calyx in anthesis about 2 mm long, puberulent outside, narrowly funnel-shaped, equally 5-toothed, the teeth obtuse, 0.5 mm long, as wide as long, accrescent and persistent, 2-lipped in fruit. Corolla white or greenish-white, slightly exserted, 4.5 mm long, the tube broad, cylindric, straight, glabrous outside, inside somewhat villous, about 1.5 mm long, the limb prominently 2-lipped, the smaller lip rounded, about 2 mm in diameter, entire, imbricately covering the larger lip in bud, the larger lip prominently 3-lobed, the middle lobe rounded, 1.6 mm in diameter, entire, the lateral lobes about 1 mm long and 1.5 mm wide, all lobes reflexed, or the middle lobe of the upper lip suberect. Stamens 4, inserted in the tube, the filaments 0.5 mm long; anthers ovate or broadly elliptic, 0.6 mm long, the cells parallel, not divergent. Ovary ovoid, glabrous, 2-celled, each cell 2-ovuled; style less than 1 mm long, minutely cleft at the apex. Fruit black, broadly obovoid, tipped by the remains of the style, about 5 mm long, 4 mm in diameter, somewhat inequilateral, the pericarp thin, fleshy, the endocarp bony, longitudinally rugose. 1-celled, containing a single seed, but frequently with indications of an additional cell, the second cell rarely developing a seed. Calyx accrescent, persistent, in fruit nearly 4 mm in diameter, distinctly 2-lipped, the larger lip with three, 0.5 mm long teeth, the smaller lobe with two similar but distant teeth. Seeds oblong, compressed, exalbuminous.

Luzon, Province of Cagayan, Piat, *Bur. Sci. 7841 Ramos*, April 2, 1909: Province of Isabela, Ilagan, *Bur. Sci. 8124 Ramos*, April 29, 1909, in open grassy plains.

This curious little plant apparently represents the type of a new genus allied to *Premna* and *Vitex*, but more especially to the former. It differs remarkably from all species of both genera in its habit and in its small size as well as in floral and fruit characters indicated in the diagnosis. The stout roots, much larger then the stems, reach a diameter of 5 mm. Striking characters of the genus, aside from the small size and habit of the plant are its 2-lipped corollas,

the smaller, exterior lip entire, the upper and inner lip strongly 3-lobed, and its calyx, which in anthesis is equally 5-toothed, but in fruit is accrescent and distinctly 2-lipped, one lip 3-toothed, the other 2-toothed.

VITEX Linn.

Vitex longifolia sp. nov.

Arbor inflorescentiis exceptis glabra, circiter 12 m alta; foliis trifoliolatis, petiolo 5 ad 9 cm longo, foliolis oblongo-lanceolatis vel anguste oblongo-ovatis, longe subcaudato-acuminatis, basi acutis vel acuminatis, plus minus inaequilateralibus, usque ad 25 cm longis, subcoriaceis, nervis utrinque circiter 10, subtus prominentibus; paniculis terminalibus, pedunculatis, amplis, plus minusve pubescentibus; floribus fasciculatis.

A tree about 12 m high, glabrous except the inflorescence. Branches grayish, the ultimate ones somewhat compressed. Leaves 3-foliolate, the petioles terete, 5 to 9 cm long. Leaflets oblong-lanceolate to broadly ovate-lanceolate, subcoriaceous, somewhat shining when dry, brownish, paler beneath, 20 to 25 cm long, 5 to 7 cm wide, entire, the apex with a long, slender acumen, the base somewhat inequilateral, acute or acuminate; nerves about 10 on each side of the midrib, beneath prominent, curved-ascending, rather distant, anastomosing, the primary reticulations lax; petiolules of the lateral leaflets less than 1 cm long, of the middle leaflet nearly 2 cm in length. Panicles terminal, solitary, equaling the leaves, the peduncle 15 cm long, sometimes with a single branch from the base, most of the primary branches from above the middle, usually about four at each node, the ultimate branches and branchlets more or less brown-pubescent. Flowers in fascicles on the ultimate branchlets, usually in groups of one central slightly pedicelled flower and two lateral shortly peduncled groups of three flowers each, the bracts small, 2 mm long or less. Calyx pubescent, cup-shaped, 2 mm long and wide, with five, short, acute teeth less than 0.5 mm long. Corolla lilac, pubescent inside and outside, the tube cylindric, 5 to 6 mm long, the upper lip bifid, 5 to 6 mm long, the lobes narrowly obovate, rounded, the lower lip 3-cleft, the lobes oblong, acute or obtuse, 3 mm long. Filaments somewhat pubescent, the longer two about 8 mm, the shorter ones about 6 mm in length. Fruit unknown.

MINDANAO, Province of Surigao, in well-drained flat forests on the Gibon River, altitude about 55 m, *For. Bur. 7574 Hutchinson*, June, 1907, locally known to the Manobos as *manamu* and to the Visayans as *aticóco*.

A species in the group with *Vitex parviflora* Juss. (*V. littoralis* Dene.), but distinguishable by its quite different and much larger leaflets.

TECTONA Linn. f.

Tectona philippinensis Benth. & Hook. f. Gen. Pl. 2 (1876) 1152; F.-Vill. Nov. App. (1880) 158; Vidal Phan. Cuming. Philip. (1885) 134, Rev. Pl. Vasc. Filip. (1886) 209, (*nomen nudum* in all cases).

Tectona hamiltoniana Wall.; Schauer in DC. Prodr. 11 (1847) 629, pro parte (quoad pl. Philip.); F.-Vill. l. c.

Arbor usque ad 15 m alta; foliis elliptico-ovatis ad ovato-lanceolatis, acuminatis, 8 ad 15 cm longis, supra glabris vel subglabris, albido-verruculosis, subtus dense pallide stellato-puberulis; cymis terminalibus, densis; floribus circiter 8 mm longis; fructibus circiter 13 mm diametro, calycibus persistentibus vix inflatis.

A tree reaching a height of 15 m. Leaves elliptic-ovate to ovate-lanceolate, acuminate, 8 to 15 cm long, 3 to 6 cm wide, subcoriaceous, subentire or the margins above obscurely undulate-crenate, the upper surface glabrous or nearly so, rather densely white-verrucose, beneath paler and densely stellate-puberulent; nerves 5 to 7 on each side of the midrib, distinct beneath, the reticulations dense; petioles densely puberulent, 5 to 7 mm long. Cymes terminal, sometimes in the upper axils, in anthesis rather dense, becoming rather diffuse in fruit, densely puberulent. Flowers nearly 8 mm long and 10 mm in diameter. Calyx densely puberulent, funnel-shaped, 5 mm long, equally 5-toothed, the teeth triangular-ovate, 2 mm long. Corolla-tube for the lower 1 to 1.5 mm cylindric, about 5 mm in diameter, then abruptly enlarged, the lobes elliptic-ovate, obtuse, about 4 mm long, the throat villous inside. Filaments about 8 mm long, slender, somewhat exserted. Fruit about 13 mm long, 5 to 6 mm in diameter, the persistent calyx enclosing the drupe but not inflated, densely puberulent with pale-brownish indumentum, the drupe about 8 mm long.

LUZON, Province of Batangas, *Cuming 1432* (type number), *For. Bur. 7746 Curran & Merritt*, November, 1907, the latter growing in rather open brush lands at an altitude of about 50 m, locally known as *malapangit*.

As no description of the above species has ever been published, a short one has been given above. Cuming's specimen was referred by Schauer to *Tectona hamiltoniana* Wall., but Bentham & Hooker f. were undoubtedly right in specifically separating the Philippine plant from the Asiatic one. It is manifestly closely allied to Wallich's species, but differs remarkably in the nature of the indumentum, which in *T. hamiltoniana* Wall. is tomentose or stellately wooly, and in the present species minutely and very densely puberulent.

Cuming's plant has been localized from his own list of localities preserved in his correspondence with Sir William Hooker at Kew, and is undoubtedly correct.

LABIATÆ.

SALVIA Linn.

Salvia scaphiformis Hance in Journ. Bot. 23 (1885) 368: Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 287.

LUZON, Province of Nueva Vizcaya, *Merrill 174:* Province of Abra, *Bur. Sci. 7206 Ramos:* Province of Benguet, *Elmer 5834, 8637.*

Not previously reported from the Philippines; Formosa, and Szechuen, China.

SCROPHULARIACEÆ.

BYTHOPHYTON Hook. f.

Bythophyton indicum (Hk. f. & Th.) Hk. f. Fl. Brit. Ind. 4 (1884) 286.

Micranthemum indicum Hk. f. & Th. in Journ. Bot. 9 (1857) 245, *t.* 7 (excl. fig. of anthers, fide Hooker f.)

LUZON, District of Lepanto, Mount Data, *Merrill 4519*, November, 1905, in shallow water of a small pond at the summit, altitude about 2,250 m.

A monotypic genus previously recorded only from the Nonkreem marshes, Khasia Mountains, India, altitude about 1,400 m. I am indebted to the director of the Royal Gardens, Kew, for the identification of the above specimen.

ACANTHACEÆ.

PERISTROPHE Nees.

Peristrophe lancifolia sp. nov.

Herba erecta vix vel parce ramosa, sparse strigosa; foliis membranaceis, anguste lanceolatis, acuminatis, usque ad 20 cm longis, 2.5 cm latis; foliis floralibus oblongis vel oblongo-lanceolatis, acuminatis; corolla alba, 5 cm longa.

An erect herb about 50 cm high or less, usually unbranched. Stems green, longitudinally sulcate, about 2 mm in diameter, glabrous, or the younger parts slightly appressed-strigose. Leaves lanceolate or narrowly lanceolate, 12 to 20 cm long, 1 to 2.5 cm wide, entire or very slightly undulate, gradually narrowed upward to the long, slender, acuminate apex, the base also narrowed, acute or acuminate, somewhat shining when dry, the upper surface dark-green, the lower surface pale-green, both surfaces with numerous, scattered, oblong cystoliths, the lower also minutely white-puncticulate and slightly appressed-strigose on the midrib and nerves; lateral nerves about 9 on each side of the midrib, ascending, anastomosing and forming a nearly straight submarginal nerve, the secondary nerves and reticulations lax; petioles 5 mm long or less, strigose. Peduncles few, 2.5 cm long or less, terminal and in the upper axils, strigose, few-flowered. Floral leaves 2, unequal, oblong to oblong-lanceolate, acuminate, 2.5 to 3.5 cm long, more or less strigose, especially on the margins. Flowers white, congested, each subtended by one or two linear-lanceolate, more or less hispid, long-acuminate bracts about 2 cm long, 2 mm wide, and by two or three similar but smaller bracteoles. Calyx-lobes similar to the bracteoles, subequal, about 8 mm long, hispid. Corolla 5 cm long, the tube slender, 2.5 cm in length, one lip entire, 1.5 cm broad, the other somewhat narrower and shortly 2-toothed at the apex. Filaments slightly hirsute; anthers 2-celled, the upper cell about 3.5 mm long, the lower 2 mm long, muticous. Style minutely bifid.

Pod about 1.5 cm long, hirsute, long-stalked; seeds 4. Placenta persistent, not separating from the capsule in dehiscence.

LUZON, Province of Bataan, Balanga Mountains, *For. Bur. 19258 Curran*, January, 1910.

A species well characterized by its narrowly lanceolate, long leaves and by its large flowers.

RUBIACEÆ.

GREENIOPSIS Merr.

Greeniopsis pubescens sp. nov.

Arbor parva vel mediocris, omnibus partibus plus minus dense brunneo-pubescens; foliis oblongo-lanceolatis vel oblongo-oblanceolatis, usque ad 40 cm longis, longe acuminatis, basi angustatis, nervis utrinque circiter 20, stipulis 3 cm longis; capsulis 4 mm longis.

A small or medium-sized tree pubescent throughout. Branches stout, the ultimate ones about 8 mm in diameter, pubescent with short brownish hairs. Leaves oblong-lanceolate or oblong-oblanceolate, 20 to 40 cm long, 6 to 11 cm wide, subcoriaceous, shining when dry, both surfaces pubescent with rather short hairs, or the upper subglabrous, entire, the apex rather slenderly long-acuminate, narrowed to the base, the lamina decurrent practically to the base of the short petiole, so that the leaves are subsessile; nerves about 20 on each side of the midrib, prominent, curved, anastomosing, the ultimate reticulations distinct; stipules oblong-lanceolate, chartaceous, 3 cm long, 1 cm wide at the base, acuminate, at first pubescent, becoming nearly glabrous, deciduous. Panicles terminal and in the upper axils, peduncled, nearly as long as the leaves, branched at or above the middle, the rachis, branches and branchlets densely brown-pubescent with short hairs, the branches flower-bearing only above the middle. Flowers white, pedicelled, the calyx pubescent, about 3 mm long, narrowly funnel-shaped, becoming somewhat inflated, the teeth 5, short, truncate, imbricate, broader then long. Corolla rather densely pubescent outside, the throat villous within, the tube about 2 mm long, rather abruptly enlarged above, the lobes 5, rounded, imbricate, about 1.5 mm long, 2.5 mm wide. Anthers 1.4 mm long. Capsules subsecund on the ultimate branchlets, oblong or oblong-ovoid, densely pubescent, 4 mm long, the persistent calyx-teeth oblong, pubescent on both surfaces.

LUZON, Province of Isabela, Bicobian Bay, *Bur. Sci. 10659 McGregor*, August, 1909: Province of Cagayan, *Bur. Sci. 7407 Ramos*, March, 1909 (type).

In general appearance very similar to the other two species of the genus, but well characterized by its rather uniformly distributed pubescence, which consists of short, usually spreading and brownish hairs. The third species for the genus.

HEDYOTIS Linn.

Hedyotis cagayanensis sp. nov.

Frutex erectus, simplex, vix 1 m altus, glaber, partibus junioribus plus minus puberulis exceptis; caulibus teretibus, partibus junioribus quadrangulatis, pulcherrime undulato-crenato-alatis; foliis membranaceis, amplis, petiolatis, usque ad 18 cm longis, oblongo-obovatis vel elliptico-obovatis, nervis utrinque circiter 8; cymis axillaribus, in capitulis subglobosis dense congestis.

An erect undershrub about 60 cm high, unbranched, glabrous, or the younger parts more or less puberulent. Stem stout, brownish, about 6 mm in diameter, the basal part terete, the younger parts above 4-angled, each angle with a striking undulate-crenate wing 1 to 2 mm in width. Leaves oblong-obovate to elliptic-obovate, membranaceous, glabrous, somewhat shining, 13 to 18 cm long, 5 to 8 cm wide, the apex blunt, acute, or broadly acuminate, the base acute; nerves about 8 on each side of the midrib, distinct, ascending, the reticulations very obscure, lax; petioles 1.5 to 2 cm long; stipules ovate or oblong, about 12 mm long, cut into about 12 laciniae. Cymes axillary, glabrous, densely many-flowered, forming subglobose, axillary heads about 2 cm in diameter, the flowers 4-merous; pedicels 2 mm long or less, the bracts oblong, 2 to 3 mm long. Calyx-tube somewhat 4-angled, glabrous, 1.5 mm long, the lobes 1.8 mm in length. Capsule obovoid, 3 mm long.

LUZON, Province of Cagayan, Pamplona, *Bur. Sci. 7502 Ramos*, March 16, 1909, in forests along streams.

A species manifestly allied to *H. pilosissima* Merr., but in adult stage quite glabrous, but more especially characterized by its square, prominently 4-winged stems, the wings undulate-crenate.

Hedyotis macgregorii sp. nov.

Frutex erectus, ramulis foliis inflorescentiisque plus minus strigoso-pubescentibus; foliis elliptico-oblongis vel elliptico-lanceolatis, usque ad 5.5 cm longis; cymis parvis, axillaribus terminalibusque, subsessilibus vel breviter pedunculatis, densis, paucifloris; corolla circiter 6 mm longa.

An erect much-branched shrub. Branches terete, glabrous, grayish, the younger ones prominently 4-angled and rather densely pubescent. Leaves elliptic-oblong to elliptic-lanceolate, chartaceous or subcoriaceous, 2 to 5.5 cm long, 1 to 2 cm wide, the base acute, the apex blunt, acute or even slightly acuminate, the lower surface more or less strigose-pubescent with short hairs, especially on the midrib and nerves, the upper surface also more or less pubescent, ultimately becoming glabrous or nearly so; nerves about 5 on each side of the midrib, curved-ascending, anastomosing, the reticulations obsolete or nearly so; petioles densely

pubescent, 2 to 4 mm long; stipules pubescent, ovate, persistent, 3 to 4 mm long, cut into six or more linear laciniæ. Cymes terminal and in the upper axils, small, dense, comparatively few-flowered, subsessile or the axillary ones sometimes with peduncles up to 1.5 cm in length, all parts more or less pubescent, the bracts foliaceous, spatulate, 5 to 6 mm long, the pedicels usually about 1 mm in length. Calyx-tube ovoid, pubescent, 2 mm long, the lobes usually 4, lanceolate, acuminate, pubescent, 3 mm long. Corolla apparently white, 6 mm long, the tube 4 mm in length, cylindric, glabrous outside, villous within, usually with 4 lobes, rarely with 3 or 5, the lobes oblong, obtuse or acute, 2 mm long, reflexed in anthesis, slightly strigose on the back. Anthers 1.2 mm long. Style 3.5 mm long, cleft at the apex. Capsule ovoid, 3.5 mm long, somewhat strigose-pubescent, the seeds black, compressed, angular, irregular, 1.2 to 1.5 mm long.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 8490 McGregor*, June, 1909 (type), *Bur. Sci. 4473 Mearns*, August, 1907.

Apparently a species of the mossy forest, allied to *Hedyotis benguetensis* Elm., and other species of that group, but well characterized by its strigose pubescence.

Hedyotis pilosissima sp. nov.

Frutex vel suffrutex erectus, simplex, vix 1 m altus, omnibus partibus plus minus dense pilosus; foliis chartaceis vel submembranaceis, oblongo-lanceolatis vel oblongo-ellipticis, usque ad 16 cm longis, acuminatis, basi acutis, nervis 6 vel 7 utrinque, adscendentibus; stipulis amplis, laciniatis; cymis in axillis dense congestis, subcapitatis, dense multifloris.

An erect unbranched suffrutescent or decidedly woody undershrub less than 1 m high, the stems terete, about 6 mm in diameter, brownish or grayish, densely pilose. Leaves oblong-lanceolate to oblong-elliptic, 12 to 16 cm long, 3 to 5.5 cm wide, chartaceous or submembranaceous, greenish when dry, somewhat shining, the apex acuminate, base acute, both surfaces with numerous, long, white hairs, especially so on the midrib and nerves on the under surface; nerves 6 or 7 on each side of the midrib, distinct, ascending, not or obscurely anastomosing, the secondary nerves and the reticulations obsolete; petioles pilose, 1.5 to 2 cm long; stipules ample, green, somewhat pilose, up to 1.5 cm long, 1.2 cm wide, cut into about 12, narrowly lanceolate, acuminate laciniae 3 to 5 mm in length, the middle one longer. Cymes axillary, more or less pilose, congested, forming subglobose or hemispherical inflorescences 1 to 2 cm in diameter. Flowers 4-merous, their pedicels up to 2 mm in length, sometimes wanting, the bracteoles lanceolate, acuminate, 2 mm long. Calyx-tube ovoid, glabrous, about 1.2 mm long, the lobes green, lanceolate, acuminate, 2 mm long, the margins ciliate with long white hairs. Corolla-tube 2 mm long, the lobes about the same length, oblong, recurved, usually acute. Anthers 1 mm long. Capsule globose or ovoid, glabrous except for the few hairs on the persistent calyx-lobes, about 2

mm in diameter; seeds numerous, angular, black, about 0.3 mm in diameter.

PANAY, Dumarao, in damp, shaded ravines along streams, at an altitude of about 100 m, *Merrill 6704*, March 25, 1910.

A species well characterized by its ample leaves and dense pubescence. A specimen from Maagnas, Province of Camarines, Luzon, *Bur. Sci. 6326 Robinson*, August, 1908, may be referable here, but in this plant the capsules are pilose, not glabrous.

IXORA Linn.

Ixora capitulifera sp. nov.

Arbor glabra circiter 10 m alta; foliis subcoriaceis, in sicco brunneis, nitidis, oblongis vel oblongo-obovatis, acuminatis, basi leviter rotundatis, breviter petiolatis; floribus circiter 1.5 cm longis, subsessilibus, in capitulis parvis, densis, longe pedunculatis dispositis; calycis dentibus quam tubus brevioribus.

A glabrous tree about 10 m high. Branches terete, stout, grayish. Leaves oblong or oblong-obovate, 4 to 11 cm long, 1.5 to 5 cm wide, subcoriaceous, brown and shining on both surfaces when dry, the apex shortly and usually bluntly acuminate, rarely nearly acute, the base narrowed, somewhat rounded, rarely subacute; nerves about 12 on each side of the midrib, slender, brown, distinct, anastomosing; petioles less than 2 mm long. Inflorescence terminal and axillary, the peduncles slender, 2 to 4 cm long, each subtended by from 2 to 4, distichous, broadly ovate, acuminate bracts about 2.5 mm long, 2 mm wide, usually with a pair of smaller, narrower bracts above the middle. Flowers 5 to 8 at the end of each peduncle, sessile, congested, the calyces forming a rather dense head less than 6 mm in diameter. Calyx 2 mm long, the teeth 4, triangular-ovate, acute or somewhat obtuse, small, the bracteoles 2, linear, about 1 mm long. Corolla-tube 13 mm long, 1 mm in diameter, the lobes four, elliptic, rounded or obtuse, about 4 mm long, 2.5 mm wide.

PALAWAN, Mount Victoria, in forests along streams at an altitude of about 1,050 m, *Bur. Sci. 686 Foxworthy*, March 23, 1906, the flowers said to be pinkish or whitish, with a faint wintergreen odor.

The species is a very characteristic one, readily recognizable by its slenderly peduncled capitate inflorescence.

Ixora crassifolia sp. nov.

Arbor parva usque ad 9 m alta, inflorescentiis puberulis exceptis glabra, foliis crassissime coriaceis, ellipticis vel oblongo-ellipticis, apice rotundatis vel leviter retusis, usque ad 34 cm longis, nitidis, utrinque in sicco dense minute rugosis, nervis utrinque circiter 10; inflorescentiis terminalibus, puberulis, circiter 9 cm longis, dense multifloris; floribus circiter 2.5 cm longis.

A small tree 9 m high or less, glabrous except the somewhat cinereous-puberulent inflorescence. Branches rather stout, brown or grayish. Leaves elliptic, broadly elliptic or oblong-elliptic, 14 to 24 cm long, 7

to 18 cm wide, very thickly coriaceous, somewhat shining, when dry minutely and densely rugose on both surfaces, the apex rather broadly rounded, sometimes slightly retuse, the base acute or somewhat acuminate, rarely broadly rounded; nerves about 10 on each side of the midrib, distinct, anastomosing, the reticulations lax; petioles stout, 1 to 2 cm long; stipules very broadly ovate, abruptly acuminate, 5 to 7 mm long, deciduous. Inflorescence terminal, puberulent, corymbose, subtended by one or two pairs of broadly ovate, abruptly acuminate bracts 8 mm long or less, with two lateral basal branches, the rachis short, trichotomously branched, the primary branches stout, 3 to 5 cm long, all subtrichotomously branched at their apices, forming a rather dense inflorescence about 9 cm long, and as wide or wider than long. Flowers white or greenish-white, rather densely crowded at the ends of the ultimate branchlets, their pedicels 1 to 2 mm long, ebracteolate. Calyx ovoid, puberulent, about 2 mm long, with 4 short, broadly ovate, acute teeth about 0.3 mm long. Corolla-tube rather slender, 2.4 cm long, 2 mm wide when more or less flattened out, the lobes 4, spreading or reflexed, oblong, rounded, 7 mm long, 4 mm wide. Anthers linear, 5 mm long, the filaments exserted about 3 mm. Style slender, exserted about 6 mm, the arms thickened, more or less flattened, about 2 mm long.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9039, 9070, 9439* (type), *9479 Whitford & Hutchinson*, December, 1907, and February, 1908, in dipterocarp forests at from 30 to 50 m above the sea.

A species well characterized by its unusually large, very coriaceous leaves, which, when dry, are rather pale and minutely, densely rugose on both surfaces.

Ixora ebracteolata sp. nov.

Ixora amboinica Elm. Leafl. Philip. Bot. 1 (1906) 9, non DC.

Arbuscula vel arbor parva, 3 ad 8 m alta, inflorescentiis exceptis glabra; foliis petiolatis, coriaceis vel subcoriaceis, in sicco brunneis, nitidis, oblongis vel oblongo-ellipticis, obtusis vel late brevissime acuminatis, basi acutis, nervis utrinque circiter 10, distinctis; cymis terminalibus, puberulis vel subglabris, pedunculatis, multifloris; floribus 9 ad 12 mm longis, ebracteolatis.

An erect shrub or tree 3 to 8 m high, glabrous except the inflorescence which is usually puberulent. Branches terete, gray, the younger ones usually reddish-brown. Leaves oblong to oblong-elliptic, 6 to 12 cm long, 2.5 to 5 cm wide, the base acute or decurrent-acuminate, the apex obtuse, rounded, or broadly and obtusely short-acuminate, brown and shining when dry, the lower surface paler than the upper; primary nerves about 10 on each side of the midrib, anastomosing, brown, distinct, the reticulations rather lax, distinct; petioles 5 to 10 mm long; stipules lanceolate-acuminate from an ovate base, 5 mm long or less. Inflorescence terminal, rather dense, 5 to 7 cm in diameter, usually puberulent, sometimes glabrous peduncled, many-flowered, the peduncles 3 to 5 cm long, the lower branches spreading, about 2 cm long. Flowers white, mostly in triads on

the ultimate branchlets, the middle one of each triad sessile or subsessile, the two lateral ones with pedicels 3 to 5 mm in length, the bracts and bracteoles wanting. Calyx glabrous, ovoid, about 3 mm long, the teeth broadly triangular-ovate, acute, 0.5 mm long. Corolla-tube 6 to 9 mm long, about 2 mm in diameter, the lobes 4, elliptic-oblong, acute or slightly acuminate, 6 mm long, 2.5 to 3 mm wide. Anthers 3.5 mm long, lanceolate, acuminate. Style slightly exserted; stigma cleft, 2 mm long. Fruit ovoid, smooth, somewhat fleshy when fresh, 8 mm long or less, dark-colored when dry.

LUZON, Province of Zambales, Mahumaling, *For. Bur. 5845 Curran*, January, 1907 (type), on dry cogon-covered slopes; other specimens from the same province are: *Bur. Sci. 4798, 5038 Ramos, For. Bur. 375 Maule, Merrill 2953, 2985, 2080.* Various local names are *pamutim, pilis, lumboy-manoc, talab, and tatanic.*

The species is entirely different from *Ixora amboinica* DC., to which Mr. Elmer referred several of the specimens above cited; it is distinguished from the majority of the species in the genus by the entire absence of bracts and bracteoles.

Ixora longissima sp. nov.

Arbuscula erecta, glabra; foliis petiolatis, lanceolatis, usque ad 40 cm longis, crasse membranaceis, sensim longe acuminatis, margine minute crenato-undulatis; cymis terminalibus, diffusis, amplis, multifloris; floribus circiter 5 cm longis; calycis dentibus acutis, quam tubus brevioribus.

An erect glabrous shrub. Branches terete, pale-brown, smooth and shining. Leaves lanceolate, about 40 cm long, 5.5 cm wide, thickly chartaceous, shining when dry, the base acute or somewhat decurrent-acuminate, gradually narrowed upward into the long, slender, acuminate apex, the margins minutely crenate-undulate; nerves about 23 on each side of the midrib, slender, not very prominent, anastomosing, the reticulations lax; petioles stout, 1 to 1.5 cm long; stipules very broad, connate, abruptly acuminate, about 5 mm long. Cymes terminal, very large, trichotomously branched and rebranched, the peduncle stout, about 5 mm long, the primary branches about as long as the peduncle, spreading, the whole inflorescence, including the corollas, about 20 cm wide. Flowers apparently pink or reddish, numerous, in triads on the ultimate branchlets, the middle one of each triad sessile, the two lateral ones with pedicels 2 to 3 mm long, the bracts oblong-ovate, acuminate, 2 to 3 mm long, the bracteoles similar but smaller, 1 mm long. Calyx 2 mm long, the teeth ovate, acute, about 0.5 mm long. Corolla-tube slender, about 4.5 cm long, the lobes broadly ovate-lanceolate or elliptic-lanceolate, acuminate, thin, reticulate, about 10 mm long, 4 mm wide.

LEYTE, without definite locality; *For. Bur. 16975 Rosenbluth*, March, 1909.

A species well characterized by its very long leaves which are long and slenderly acuminate, as well as by its ample, diffuse panicles and very long flowers. It is probably most closely allied to *Ixora salicifolia* DC., but seems to be sufficiently distinct.

Ixora longistipula sp. nov.

Frutex glaber 1.5 ad 3 m altus; foliis petiolatis, oblongo-lanceolatis, chartaceis, acuminatis, basi acutis; stipulis setaceis, 1 ad 1.8 cm longis; inflorescentiis terminalibus longe pedunculatis, floribus circiter 2 cm longis in capitulis parvis dense confertis; calycis dentibus acutis, quam tubus brevioribus.

A glabrous shrub 1.5 to 3 m high. Branches terete, slender, reddish-brown. Leaves oblong-lanceolate, 10 to 20 cm long, 3 to 4.5 cm wide, chartaceous, usually firmly so, shining, narrowed at both ends, the base acute, the apex sharply acuminate; lateral nerves about 13 on each side of the midrib, distinct, anastomosing, the reticulations lax; petioles about 1 cm long; stipules setaceous, about 1 cm long, broadened at the base. Inflorescence terminal, solitary, the peduncles slender, 9 to 15 cm long, the flowers subsessile or shortly pedicelled, disposed in a terminal, simple, dense head, this head, excluding the corollas, less than 1 cm in diameter, usually about 25 flowers in each. Bracteoles narrowly lanceolate, acuminate, 1 to 2 mm long. Calyx narrowly campanulate, 2 to 2.5 mm long, the teeth ovate, acute, about 1 mm in length. Corolla slender, pink, the tube about 2 cm long, 1 mm in diameter, the lobes 4, broadly elliptic, spreading, rounded, 4 to 4.5 mm long, 3 to 3.5 mm in diameter. Anthers 3 mm long. Style slightly exserted, the arms flattened, 1.5 mm long. Fruit globose, fleshy, white to pink, about 1 cm in diameter, the seeds elliptic in outline, 7 mm long, 5 mm wide.

Negros, Mount Marapara, *For. Bur. 13625 Curran & Foxworthy*, September, 1909 (type), *For. Bur. 13694 Curran;* near Cadiz, *Bur. Sci. 7327 Celestino*, March, 1909. Mindoro, Mount Halcon, *Merrill 5569*, November, 1906.

A sylvan species ranging from 500 to 700 m above the sea, well characterized by its elongated, setaceous stipules, and its long-peduncled, capitulate inflorescence.

Ixora mearnsii sp. nov.

Arbuscula erecta glabra; foliis oblongis vel late oblongo-lanceolatis, chartaceis vel submembranaceis, acuminatis, basi acutis vel leviter rotundatis, petiolatis, usque ad 18 cm longis, in sicco nitidis, nervis utrinque circiter 11, distinctis; cymis terminalibus, multifloris, densis; floribus circiter 3 cm longis, calycis segmentis acutis, quam tubus brevioribus.

An erect glabrous shrub. Branches terete, or the younger ones obscurely angled, dark-reddish-brown, shining. Leaves oblong to broadly oblong-lanceolate, 12 to 18 cm long, 3 to 7 cm wide, chartaceous or submembranaceous, shining on both surfaces, when dry olivaceous above, paler beneath, the apex very sharply acuminate, the base acute or narrowed and slightly abruptly rounded; nerves about 11 on each side of the midrib, distinct on the lower surface, anastomosing, the reticulations lax; petioles about 1 cm long; stipules connate, subtruncate, abruptly and shortly apiculate-acuminate, the margins slightly ciliate, 2 to 3 mm long. Cymes terminal, shortly peduncled, including the flowers about 7

cm long, 10 cm wide, dense, many-flowered, the branches trichotomously branched. Flowers apparently pink, mostly in triads on the ultimate branchlets, the middle one of each triad sessile, the two lateral ones with pedicels 3 mm long or less; bracts subtending the branches small, ovate, acuminate, the bracteoles similar, ovate, acuminate, 1 to 1.2 mm long. Calyx 2 to 3 mm long, the teeth ovate, acuminate or acute, 1 mm long. Corolla-tube 26 mm long, 1 mm in diameter, the lobes elliptic to elliptic-oblong, reticulate, membranaceous, acute or minutely acuminate, 7 to 8 mm long, 4 to 5 mm wide. Anthers 3 mm long, abruptly caudate-apiculate. Stigma about 1 mm long, slightly exserted.

LUZON, Province of Tayabas, Casiguran, *Bur. Sci. 2999* (type), *2976 Mearns*, June 1, 1907. A specimen from Baler, Province of Tayabas, Luzon, *Bur. Sci. 10672 McGregor*, August, 1909, is similar but has a more lax inflorescence, longer flowers, the corolla-tube 3 cm in length, and the calyx-teeth are obtuse or rounded.

A species allied to *Ixora congesta* Roxb., but with thinner, fewer-nerved leaves, and more lax inflorescence.

Ixora mindanaensis sp. nov.

Arbuscula 2 ad 3 m alta, cymis parce puberulis exceptis glabra; foliis lanceolatis, oblongo-lanceolatis, vel oblongo-oblanceolatis, coriaceis vel subcoriaceis, petiolatis, usque ad 16 cm longis, basi acutis vel acuminatis, apice acuminatis, nervis utrinque 8 ad 10, distinctis, laxissime reticulatis vel reticulis subobsoletis; cymis terminalibus, e basi 3-ramosis; floribus circiter 11 mm longis, calycis dentibus parvis, obtusis, quam tubus brevioribus.

A shrub 2 to 3 m high, erect, branched, glabrous except the inflorescence. Branches terete, rather slender, light-gray. Leaves lanceolate, oblong-lanceolate, or oblong-oblanceolate, 8 to 16 cm long, 3 to 6 cm wide, coriaceous or subcoriaceous, when dry shining on both surfaces, brown, paler beneath, the apex rather sharply acuminate, the base gradually narrowed, acute or somewhat acuminate; nerves 8 to 10 on each side of the midrib, beneath distinct, usually brown, anastomosing, the reticulations very lax, often nearly obsolete; petioles about 5 mm long; stipules ovate to oblong-ovate, acuminate, about 5 mm long, deciduous. Cymes terminal, somewhat puberulent, branched from the base, the branches three, 2 cm long or less, each bearing at the apex from three to five short secondary branches, the flowers all sessile or subsessile, in groups of threes on the ultimate branchlets, densely disposed, the cymes 5 cm long or less; bracts very small, obscure, the bracteoles similar, minute, linear, 0.5 mm long. Calyx 2 to 2.5 mm long, puberulent, the teeth ovate, obtuse, 0.5 mm long. Corolla-tube white or pinkish, about 9 mm long, 1 mm in diameter, the lobes elliptic-oblong, 3.5 mm long, 1.5 to 1.8 mm wide, obtuse, 6-nerved, nerves mostly anastomosing. Anthers 3 mm long, acute or obtuse. Stigma slightly exserted, 2 mm long, cleft.

Fruit red, depressed-globose, somewhat compressed, about 1 cm wide, nearly as long, glabrous, smooth, somewhat longitudinally depressed between the seeds, crowned by the short calyx-rim.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9010* (type), *9034 Whitford & Hutchinson*, November 29 and December 2, 1907; Sax River, *Williams 2192*, February 4, 1905: Province of Misamis, Malabug River, trail to Mount Malindang, *For. Bur. 4773 Mearns & Hutchinson:* Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, May and November, 1906.

Ixora palawanensis sp. nov.

Frutex erectus 2 ad 3 m altus, glaber; foliis subcoriaceis, nitidis, acuminatis, lanceolatis vel oblongo-lanceolatis, usque ad 15 cm longis, nervis utrinque circiter 14; cymis terminalibus, dense multifloris; floribus 3.3 ad 3.8 cm longis, bibracteolatis, bracteolis parvis; calycis segmentis ovatis, acutis, quam tubus brevioribus.

An erect shrub 2 to 3 m high, glabrous throughout. Branches terete or somewhat compressed, smooth, somewhat shining, reddish-brown. Leaves lanceolate to oblong-lanceolate, rarely oblanceolate, 7 to 15 cm long, 1.5 to 4.5 cm wide, subcoriaceous, somewhat pale when dry, shining on both surfaces, the base acute or acuminate, apex sharply acuminate; primary nerves 12 to 15 on each side of the midrib, not prominent, anastomosing, scarcely more distinct than are the alternating secondary ones, the reticulations obscure, lax; petioles 0.3 to 0.8 cm long; stipules 5 mm long or less, base broad, apex abruptly contracted, prominently acuminate. Cymes terminal, dense, 4 to 8 cm wide, the peduncles 1 cm long or less, the lower branches up to 5 cm in length, trichotomously branched, the lower bracts lanceolate, acuminate, about 1 cm long, the bracts of the secondary branches much smaller, ovate-oblong, acuminate, 2.2 mm long; bracteoles 2 at the base of each flower, similar to the upper bracts but only 1.5 mm long. Flowers salmon- to orange-colored, numerous, mostly in triads at the ends of the ultimate branchlets, the middle one of each triad sessile, the two lateral ones with pedicels 3 to 8 mm in length. Calyx 3 to 3.3 mm long, the lobes 4, ovate, acute, 1.5 mm in length. Corolla-tube 3 to 3.5 cm long, less than 1.5 mm in diameter, the lobes oblong-lanceolate, acuminate, reticulate, rather thin, about 11 mm long, 3.5 mm wide. Anthers 3 mm long. Style slightly exserted; stigma cleft. Fruits ovoid, about 1 cm long, dark-reddish-brown when dry, obtuse or slightly beaked.

PALAWAN, in forests about 1½ miles northwest of Iwahig, *Bur. Sci. 793 Foxworthy*, April 22, 1906, in forested ravines.

A species manifestly allied to *Ixora congesta* Roxb., but with relatively narrower, smaller leaves which are sharply acuminate, the veins not prominent, etc.

Ixora philippinensis sp. nov.

Arbuscula vel arbor parva, 2 ad 7 m alta, inflorescentiis exceptis glabra; foliis subcoriaceis, subsessilibus, oblongo-ovatis, elliptico-ovatis, vel ovatis,

usque ad 15 cm longis, in sicco nitidis, plerumque brunneis, breviter acuminatis vel acutis, basi late rotundatis plerumque distincte cordatis; cymis puberulis, terminalibus, paucifloris, breviter pedunculatis, densis; floribus 1.8 ad 2.2 cm longis, calycis dentibus minutis, apiculato-acuminatis, quam tubus brevioribus.

A shrub or small tree 2 to 7 m high, glabrous except the usually puberulent inflorescence. Branches grayish to reddish-brown, terete. Leaves oblong-ovate to elliptic-ovate or ovate, shining when dry, usually brownish, paler beneath, subcoriaceous, 6 to 15 cm long, 2 to 6 cm wide, rarely wider, the apex shortly and broadly acuminate, acute, or rarely obtuse, usually minutely apiculate by the excurrent midrib, the base broadly rounded, usually distinctly cordate, the uppermost leaves sometimes somewhat surrounding the stems; petioles none or very short, rarely reaching a length of 3 mm; primary nerves about 11 on each side of the midrib, slender, usually brown and distinct beneath, anastomosing, the reticulations brown, slender, distinct; stipules lanceolate or ovate-lanceolate, prominently acuminate, 3 to 5 mm long. Cymes terminal, solitary, usually somewhat puberulent, their peduncles mostly 1 to 1.5 cm long, often subtended by a pair of reduced, ovate or suborbicular, cordate leaves 1 to 3 cm in length; bracts ovate-lanceolate, acuminate, 1.5 to 1.8 mm long. Flowers white to pale-pink, shortly pedicelled or sessile, crowded, forming a dense inflorescence which, excluding the corollas, is less than 1 cm in diameter, 10 or usually less flowers in each cyme, the branches very short. Calyx 2 mm long, slightly puberulent, the teeth very broad, minute, abruptly apiculate-acuminate, less than 0.3 mm long, the bracteoles lanceolate, acuminate, less than 1 mm long. Corolla-tube 1.8 to 2 cm long, usually slightly hairy outside, the lobes coriaceous, elliptic-oblong, rounded or obtuse, about 7 mm long, 3.5 mm wide. Anthers 3.5 mm long, apiculate. Stigma 2 mm long, cleft, slightly exserted. Fruit ovoid, apparently red when dry, the pericarp slightly fleshy, glabrous, slightly or distinctly beaked, nearly 1 cm long when mature, usually distinctly longitudinally depressed between the seeds.

The type of this species is *For. Bur. 2299 Meyer*, from the Lamao River, Province of Bataan, Luzon; other specimens from the same locality are *Whitford 1270, Leiberg 6118, Williams 378, For. Bur. 2024 Borden*, and *For. Bur. 1463 Ahern's collector.*

Ixora philippinensis includes most of the Philippine specimens that recently have been identified as *Ixora coccinea* Linn., and it appears to be one of the most widely distributed and abundant species in the Archipelago. Of our abundant material, for the most part distributed as *Ixora coccinea* Linn., I would refer to *Ixora philippinensis* specimens from the Batanes and Babuyanes Islands, from the Provinces of Ilocos Norte, Zambales, Pangasinan, Nueva Ecija, Bulacan, Rizal, Tayabas, and Camarines in Luzon, and from the Islands of Mindoro, Lubang, Guimaras, Negros, Panay, Palawan, Balabac, and Mindanao.

Ixora philippinensis is manifestly closely allied to *Ixora coccinea* Linn., especially in its sessile or subsessile, cordate leaves and other vegetative characters,

but differs in its very short calyx-teeth, shorter and usually more slender corolla, which is white or pale-pink, and in its very small, congested, few-flowered cymes. In spite of its wide distribution in the Philippines I have been unable to refer it with any degree of satisfaction to any previously described species.

Var. **brevituba** var. nov.

A typo differt cymis sessilibus vel brevissime pedunculatis, corollae tubo vix 1 cm longo.

Luzon, Province of Ilocos Norte, Pasuquin, *For. Bur. 15527 Merritt & Darling*, November 3, 1908, on limestone formation, hillsides, altitude about 100 m.

Ixora coccinea Linn. apparently does not occur in the Philippines except as an introduced and cultivated plant.

Ixora littoralis sp. nov.

Arbuscula glabra, erecta; foliis coriaceis, breviter petiolatis, basi leviter cordatis, apice acutis vel acuminatis, ovatis vel oblongo-ovatis, usque ad 6 cm longis; cymis depauperatis, congestis, paucifloris, breviter pedunculatis, axillaribus terminalibusque; floribus sessilibus vel brevissime pedicellatis, 1.6 ad 1.8 cm longis, calycis lobis acutis, quam tubus brevioribus.

A glabrous shrub. Branches stout, terete, dark-gray. Leaves ovate to oblong-ovate, 2.5 to 6 cm long, 1 to 3 cm wide, subcoriaceous, brown and shining when dry, paler beneath, the base rather broad, rounded-subcordate, apex acute or obscurely acuminate, apiculate; nerves about 8 on each side of the midrib, slender, brown, distinct beneath, the reticulations rather lax, distinct; petioles about 1 mm long; stipules lanceolate-acuminate, 3 mm long or less. Cymes axillary and terminating short lateral branches, the peduncles 5 to 6 mm long, subtended by about three pairs of imbricated, distichous bracts about 2.5 mm long, their bases broad, abruptly caudate-acuminate, the bracts subtending the few branches ovate-lanceolate, acuminate, 2 mm long, the bracteoles linear, 1 mm long or less. Cymes few-flowered, congested, the branches only about 2 mm long. Flowers in triads, the middle one sessile or nearly so, the pedicels of the lateral ones 1 to 2 mm long. Calyx 3 mm long, the teeth broadly triangular-ovate, acute, 0.5 mm long. Corolla-tube 14 to 16 cm long, 1 mm in diameter, the lobes coriaceous, not reticulated, mottled, elliptic-ovate, 5 mm long, 3 mm wide, acute or obtuse. Anthers 3.5 mm long, apiculate. Style slightly exserted; stigma cleft.

Bohol, Tagbilaran, on beach cliffs, *Bur. Sci. 1274 McGregor*, July, 1906; flowers white.

A species closely allied to *Ixora philippinensis* Merr., differing in its smaller leaves and flowers and frequently axillary inflorescence.

LASIANTHUS Jack.

Lasianthus cyanocarpus Jack in Trans. Linn. Soc. 14 (1823) 125; Hook. f. Fl. Brit. Ind. 3 (1880) 179; F.-Vill. Nov. App. (1880) 112; King in Journ. As. Soc. Beng. 73 [2] (1904) 113.

Luzon, Province of Cagayan, *Bur. Sci. 7406 Ramos*, March, 1909.

The specimen agrees closely with the description and with the single specimen

available here for comparison; not previously reported from the Philippines except for the unverified record of F.-Villar; India to the Malay Peninsula and Archipelago.

LUCINAEA DC.

Lucinaea monocephala sp. nov.

Frutex vel arbor glaber; foliis oblongo-ellipticis, brunneis, nitidis, acuminatis, usque ad 8 cm longis, nervis utrinque circiter 10, tenuibus; capitulis axillaribus, solitariis, pedunculatis, circiter 2 cm diametro.

A shrub or tree, glabrous throughout. Branches terete, rugose, gray or brown. Leaves oblong-elliptic, brown and shining when dry, paler beneath, subcoriaceous or thickly chartaceous, 5 to 8 cm long, 1.5 to 3.5 cm wide, the base acute, the apex shortly acuminate, the lower surface covered with minute, obscure, whitish, lepidote scales; nerves about 10 on each side of the midrib, slender, not prominent, the reticulations nearly obsolete; petioles 1 to 1.5 cm long. Heads axillary, solitary, brown, the peduncles stout, 3 to 4 cm long, the heads globose, about 2 cm in diameter. Corolla at least 1 cm long, the petals valvate. Calyx-rim truncate or subtruncate.

LUZON, Province of Laguna, near Dahican, *Bur. Sci. 10034 Ramos*, July, 1909 (type). NEGROS, Faraon, *For. Bur. 19074 Curran.*

Apparently most closely allied to *Lucinaea ridleyi* King, of the Malay Peninsula and Borneo, but differing, according to the description of that species, in a number of characters.

MUSSAENDA Linn.

Mussaenda albiflora sp. nov.

Frutex erectus 2 ad 5 m altus, omnibus partibus plus minus dense hirsutis; foliis chartaceis, usque ad 30 cm longis, breviter petiolatis, acuminatis, nervis utrinque 11 ad 15; paniculis terminalibus, floribus ad apices ramulorum congestis, corollae tubo albo, circiter 2.5 cm longo.

An erect shrub 2 to 5 m high, all parts more or less densely hirsute with mostly long, spreading, pale or brownish hairs. Branches terete, reddish-brown or grayish, ultimately glabrous, the young branchlets densely hirsute. Leaves chartaceous, ovate to oblong-ovate, 11 to 30 cm long, 6 to 9 cm wide, the apex rather slenderly acuminate, the base more or less decurrent-acuminate and usually slightly inequilateral, both surfaces with scattered, spreading, long hairs, either pale or brownish, and especially dense on the midrib and primary nerves; petioles 1 to 1.5 cm long, densely hirsute; stipules lanceolate, acuminate, about 1 cm long, usually ultimately cleft. Panicles terminal, all parts more or less clothed with long or short, mostly spreading hairs, the flowers congested at the apices of the branchlets, the bracts acuminate, about 7 mm long, the bracteoles similar, more or less hirsute. Pedicels short, gradually merging into the slender, slightly hirsute calyx, the calyx-tube about 2 mm in diameter, the lobes linear-lanceolate, acuminate, hirsute, 6 to 7 mm long, about 1 mm wide at the base, gradually narrowed upward to the acuminate

apex. Corolla-tube very slender, 2.5 cm long, about 1 mm in diameter, the antheriferous portion near the apex slightly inflated and about 2 mm in diameter, this portion also densely bearded inside, the outside with scattered, short hairs, the lobes linear-lanceolate, 9 to 10 mm long, 2 mm wide at the base, gradually narrowed upward to the slenderly acuminate apex, more or less pubescent. Anthers 4 to 5 mm long. Style 4 to 5 mm long, cleft one-third to one-half into two arms. The persistent leaf-like, accrescent calyx-lobe is white, elliptic-ovate, ovate, or oblong-ovate, membranaceous, 6 to 9 cm long, 3 to 5.5 cm wide, 5- to 7-nerved from the base, the nerves more or less hirsute, the reticulations lax, the apex shortly and sharply acuminate, the base acute or rounded, the stipe about 2 cm long. Fruit fleshy, narrowly obovoid, about 1.3 mm long, black when dry, with few, long, scattered hairs, the calyx-lobes, other than the accrescent one, early deciduous.

NEGROS, Faraon, *For. Bur. 17358* (type), *17359 Curran*, September, 1909, and near the same locality, *For. Bur. 5539 Everett*, September, 1906, *For. Bur. 5218 Danao & Aspillera*, June, 1906, in thickets, stream depressions, etc., at low altitudes, locally known as *agboy*.

A species well characterized by its long, slender, corolla-tubes which are white instead of yellow, differing in these characters from all Philippine species known to me.

Mussaenda philippica A. Rich. in Mém. Soc. Hist. Nat. Paris **5** (1834) 245.

Calycophyllum grandiflorum Meyen Reise **2**: 234; Walp. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 356.

Mussaenda grandiflora Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 311; Vid. Rev. Pl. Vasc. Filip. (1886) 152, non Benth. (1849).

Mussaenda frondosa Auct. Philip., non Linn.

There are at present about 60 sheets in the herbarium of the Bureau of Science that are apparently referable to a single variable species, or perhaps to several closely allied ones. The material has been identified at various times, some specimens as *Mussaenda frondosa* Linn., some as *M. grandiflora* Rolfe, and some as *M. glabra* Vahl. Rolfe in 1884 stated that he had seen no *Mussaenda frondosa* Linn., from the Philippines, and I can only agree with him in considering that the typical form of Linneus' species does not extend to the Archipelago. The type of *Mussaenda frondosa* Linn., was from Ceylon, and the Director of the Botanic Garden at Peradeniya has kindly supplied me with a full series of specimens representing the Ceylon plant, presumably some of which are typical *Mussaenda frondosa* Linn. None of this Ceylon material matches any of our Philippine specimens. Mr. Rolfe transferred *Calycophyllum grandiflorum* Meyen to *Mussaenda*, to supply a specific name for the Philippine plant, but overlooked the fact that the above specific name was invalidated in *Mussaenda* by the earlier *M. grandiflora* Benth. I have accordingly adopted for the Philippine species the name *Mussaenda philippica* A. Rich., which was based on material secured in the Philippines by Perrottet. Whether or not it is the oldest valid name for the species, I am unable to determine at the present time; some of our Philippine specimens apparently closely match some Javan and Caroline Islands material distributed as *M. frondosa* Linn., and *M. glabra* Vahl. *Mussaenda philippica* A. Rich. is an erect shrub or small tree, not at all scandent, and as at present interpreted, extends from northern Luzon to southern Mindanao, and will probably be found to extend to other parts of Malaya.

Mussaenda villosa Wall. Cat. (1832) no. 6254; Hook. f. Fl. Brit. Ind. 3 (1880) 91; King in Journ. As. Soc. Beng. 72 [2] (1903) 184.

What is apparently this species has been collected at Camp Keithley, Lake Lanao, Mindanao, by Mrs. Clemens, *no. 562*, and two specimens without number. The material agrees with Wallich's species as interpreted by Sir George King l. c., except that the pubescence is pale rather than rusty. It is the only scandent species at present known from the Philippines; widely distributed in the Malay Peninsula.

OLDENLANDIA Linn.

Oldenlandia pterita (Bl.) Miq. Fl. Ind. Bat. 2 (1857) 193.

Hedyotis pterita Bl. Bijdr. (1826) 972.

Gonotheca blumei DC. Prodr. 4 (1830) 429.

Oldenlandia alata Hook. f. Fl. Brit. Ind. 3 (1880) 70; F.-Vill. Nov. App. (1880) 107, non Koenig ex Roxb.

Luzon, Province of Cagayan, *Bur. Sci. 7824 Ramos*, April, 1909. Negros, Cabancalan, *Merrill 6430*, March, 1910. Palawan, Puerto Princesa, *Bur. Sci. 213 Bermejos*, December, 1905. Mindanao, District of Davao, *DeVore & Hoover 124*, April, 1903, *Copeland 596*, March, 1904: District of Zamboanga, *Hallier s. n.*, February, 1904.

Previously credited to the Philippines by Hooker f., and by F.-Villar. What is apparently the oldest valid specific name is adopted, for according to Hooker f., the species originally published by Roxburgh, ascribed to Koenig, is a synonym of *Oldenlandia paniculata* Linn.

Widely distributed, India to China, and Malaya.

PRISMATOMERIS Thwaites.

Prismatomeris tetrandra (Roxb.) K. Sch. in Engl. & Prantl. Nat. Pflanzenfam. 4 [4] (1891) 138.

Coffea tetrandra Roxb. Fl. Ind. 1 (1832) 538.

Prismatomeris albidiflora Thwaites in Hook. Kew Journ. 7 (1855) 268, *t. 7;* Hook. f. Fl. Brit. Ind. 3 (1880) 159; Trimen Fl. Ceyl. 2 (1894) 355: King in Journ. As. Soc. Beng. 73 [2] (1904) 90; Valeton in Bull. Inst. Bot. Buitenzorg 8 (1901) 5.

Luzon, Province of Cagayan, *Bur. Sci. 7365 Ramos, For. Bur. 13409 Bernardo, For. Bur. 16592, 17166, 17260 Curran, For. Bur. 14721, 14747 Darling, For. Bur. 18452 Alvarez*, February, March, 1909, in forests at from 30 to 200 m altitude.

Some of the specimens cited above differ from the species as described in having somewhat larger flowers and larger leaves, while others are almost an exact match for a specimen of Thwaites' Ceylon plants *no. 728* in our herbarium. All the Luzon material has 5-merous flowers and is much closer to the Ceylon plant than to several sheets in our herbarium from Perak, Penang, Singapore, and Java.

No representative of the genus has previously been reported from the Philippines; Ceylon, Burma, Khasia Mountains, Malay Peninsula and Archipelago.

PSYCHOTRIA Linn.

Psychotria phanerophlebia sp. nov.

Frutex erectus, ramulis, inflorescentiis, subtus foliis, plus minus dense castaneo- vel subrubiginoso-pubescentibus; foliis coriaceis, late oblongo-oblanceolatis, usque ad 29 cm longis, nervis utrinque circiter 22, prominentibus; cymis dense congestis, pedunculatis.

An erect shrub. Branches terete, stout, very densely dark-brown-pubescent. Leaves broadly oblong-oblanceolate, 23 to 29 cm long, 7 to 8 cm wide, the apex acute or very obscurely acuminate, gradually narrowed from about the middle to the acute base, margins recurved, coriaceous, reddish-brown when dry, glabrous and shining on the upper surface, beneath, especially on the midrib and lateral nerves, rather densely pubescent with short, dark-brown hairs; nerves about 22 on each side of the midrib, very prominent beneath, anastomosing very close to the margin, somewhat ascending, the primary reticulations subparallel; petioles densely pubescent, stout, about 3 cm long. Cymes in the upper axils, densely dark-brown-pubescent, three or more on each branchlet, their peduncles stout, about as long as the petioles, the branches short, crowded, the primary ones not exceeding 1 cm in length, the flowers densely congested, the inflorescence 3 cm or less in diameter. Flowers 5-merous, their pedicels stout, 1 to 3 mm long, densely pubescent, the bracts few, linear-lanceolate, acuminate, about 5 mm long. Calyx pubescent, the tube 4-angled, 4-sulcate, the rim above the ovary somewhat spreading, 3.5 to 4 mm long, the lobes 5, rarely 6, lanceolate, acuminate, 2 to 2.5 mm long. Corolla unknown.

LUZON, Province of Cagayan, near Pamplona, *Bur. Sci. 7404 Ramos*, March 17, 1909.

A species well characterized by its dark-brown pubescence, its congested cymes, and by its very prominently nerved, elongated leaves. It is quite different from all other Philippine forms known to me.

Psychotria ramosii sp. nov.

Arbuscula circiter 2 m alta, glabra, partibus junioribus inflorescentiisque molliter sublanato-pubescentibus exceptis; foliis membranaceis, oblongo-ellipticis vel oblongo-obovatis, in sicco nitidis, pallidis, apice acuminatis, basi angustatis, nervis utrinque circiter 12; cymis axillaribus, pedunculatis, paucifloris, plus minus dense pallide sublanato-pubescentibus.

A shrub about 2 m high. Branches terete, glabrous, smooth, dark-colored. Leaves membranaceous, oblong-elliptic to oblong-obovate, 10 to 12 cm long, 4 to 5 cm wide, pale and shining when dry, the apex shortly and obtusely acuminate, the base gradually narrowed, acute or acuminate; nerves about 12 on each side of the midrib, prominent beneath, the midrib and lateral nerves with weak, scattered, crisped hairs; petioles about 2 cm long; stipules deciduous, broadly ovate, pubescent, about 5 mm long. Cymes in the upper axils; several from each branchlet, the peduncles slender, 2 to 3 cm long, all parts more or less densely covered with weak, soft, pale, somewhat woolly hairs. Flowers white, their pedicels 1 to 2 mm long, densely pubescent. Calyx 4 to 5 mm long, densely pubescent, the lobes 5, ovate, acute or acuminate, 2 mm

long. Corolla glabrous, the tube cylindric, 3 mm long, the lobes 5, more or less spreading, coriaceous, oblong-ovate, 3 mm long, acute or obtuse. Anthers about 1 mm long. Style and stigma together 2.5 mm long. Ovary 2-celled, each cell with a single ovule.

LUZON, Province of Cagayan, near Pamplona, *Bur. Sci. 7499 Ramos*, March 17, 1909.

A species differing from all Philippine forms known to me in its sublanate inflorescence.

RANDIA Linn.

Randia ticaensis sp. nov.

Arbor circiter 6 m alta, glabra; ramulis teretibus, foliis breviter petiolatis, oblongis vel oblongo-ovatis, chartaceis, acuminatis, basi angustatis, leviter cordatis, nervis utrinque circiter 9; floribus axillaribus, solitariis vel fasciculatis, calycis lobis sub fructu lanceolato-acuminatis, circiter 4 mm longis.

A glabrous tree about 6 m high. Branches terete, grayish, slender. Leaves oblong or oblong-ovate, chartaceous, brown and only slightly shining when dry, 10 to 13 cm long, 3 to 5.5 cm wide, the apex acuminate, the base somewhat narrowed and then abruptly rounded-subcordate; nerves about 9 on each side of the midrib, distinct, somewhat ascending, obscurely anastomosing, the reticulations faint, lax; petioles about 2 mm long; stipules setaceous or lanceolate-acuminate, 4 to 4.5 mm long. Flowers unknown, but the fruits axillary, solitary or two in an axil, very shortly pedicelled, black when dry, globose, about 11 mm in diameter (not quite mature), glabrous, the calyx-tube subpersistent, cylindric, slightly puberulent, 3 mm long, with five spreading, lanceolate-acuminate, 4 mm long, 3-nerved lobes, the tube ultimately deciduous.

TICAO, Linadlaran Point, *For. Bur. 12547 Rosenbluth*, December 24, 1908, on steep hillsides at an altitude of about 30 m, locally known as *turutulang*. **Allied to *R. cumingiana* Vid., but quite distinct.**

Randia stenophylla sp. nov.

Frutex vel arbor parvus, plus minus puberulus; foliis lanceolatis vel anguste lanceolatis, subcoriaceis, basi acutis, apice acuminatis, usque ad 8 cm longis, 1.2 cm latis; cymis axillaribus, pedunculatis, vel floribus solitariis; floribus circiter 5 mm longis, 5-meris; fructibus carnosis, globosis vel ovoideis, circiter 1 cm diametro.

An erect shrub or small tree, the branches, leaves and inflorescence more or less grayish-puberulent. Branches slender, terete. Leaves lanceolate or narrowly lanceolate, 3.5 to 8 cm long, 0.5 to 1.2 cm wide, subcoriaceous, scarcely shining when dry, brown, ultimately glabrous or nearly so on the upper surface, base acute, apex acuminate; lateral nerves faint, about 13 on each side of the midrib, sometimes nearly obsolete; petioles puberulent, 1 to 2 mm long; stipules ovate, acuminate, puberu-

lent, 2 to 3 mm long. Flowers axillary, solitary, or two on a more or less elongated peduncle, the peduncle, when present, 12 mm long or less, puberulent, with 2, opposite, lanceolate-acuminate, puberulent, 3 mm long bracts at the apex, subtending two flowers. Flowers sessile or shortly pedicelled. Calyx puberulent, the tube funnel-shaped, about 2 mm long, the lobes more or less spreading, 5, ovate-oblong, acuminate, 2.5 mm long. Corolla-tube 3 mm long, villous within, the lobes oblong, 3 to 3.5 mm long, acute or acuminate, recurved or spreading. Anthers 2.5 mm long, scarcely exserted. Style 2 mm long, glabrous; stigma cleft, 2.5 to 3 mm long, densely villous. Fruit red, soft and fleshy, apparently globose or ovoid and about 1 cm in diameter, the seeds numerous, ovoid, about 3 mm long.

LUZON, Province of Bulacan, Norzagaray, on rocky river banks, *For. Bur. 7170 Curran*, June 16, 1907.

A species well characterized by its very narrow leaves and small, axillary, solitary or paired flowers, which may be sessile, or pedunculate; probably most closely allied to *Randia angatensis* F.-Vill., but quite different from that species.

TIMONIUS DC.

Timonius macrophyllus sp. nov.

Arbor circiter 10 m alta, partibus junioribus, subtus foliis, ramulis inflorescentiisque plus minus fulvo-hirsuto-villosis; foliis coriaceis, obovatis, usque ad 23 cm longis, apice rotundatis, basi acutis, nervis utrinque 8 vel 9, prominentibus; inflorescentiis brevibus, dense pubescentibus, floribus 4-meris, secundis, spicatis; fructibus subovoideis, circiter 7 mm longis, leviter longitudinaliter 4-sulcatis, pyrenis 25 ad 30.

A tree about 10 m high. Branches light-gray, subterete, rather stout, apical portions more or less compressed and pubescent. Leaves obovate, 17 to 23 cm long, 12 to 14 cm wide, the apex rounded, the base acute, coriaceous, brown and shining when dry, glabrous on the upper surface, beneath sparingly hirsute-villous, especially on the midrib and lateral nerves; nerves 8 or 9 on each side of the midrib, prominent, curved-anastomosing, the primary reticulations curved, subparallel, prominent; petioles stout, about 1 cm long. Inflorescence in the upper axils, at most 7 cm long, consisting of two or three branches 2 to 3 cm in length or less, densely fulvous-villous, the branches bearing numerous, crowded, sessile flowers along one side. Flowers 4-merous, cylindric. Calyx 3 mm long, the rim produced about 1.5 mm above the ovary, truncate, densely fulvous-villous outside. Corolla (in bud) 3.5 mm long, the four lobes oblong, obtuse, 3 mm long. Anthers 4, alternating with the corolla-lobes, 3 mm long. Style 4-angled, cleft into four arms about 2 mm in length, each arm again minutely cleft at the apex. Ovary 4-celled, each cell with from 5 to 7, rarely more locelli. Fruit subovoid, about 7 mm long, 6 mm in diameter, slightly hairy, with four rounded angles and

somewhat longitudinally 4-sulcate, 4-celled, each cell with from 5 to 7 or more pyrenes.

SAMAR, near Catbalogan, *For. Bur. 12856 Rosenbluth*, February 7, 1909, hillsides along streams at an altitude of about 200 m, locally known as *canilan*.

A species well characterized by its ample leaves, its secund spicate flowers and its pubescent younger parts, inflorescence, and leaves. In its foliage it is somewhat suggestive of *Timonius stipulosus* Val., but is very distinct from that species.

UROPHYLLUM Wall.

Urophyllum elliptifolium sp. nov.

Arbuscula erecta circiter 3 m alta, partibus junioribus plus minus furfuraceis exceptis glabra; foliis ellipticis vel oblongo-ellipticis, coriaceis, nitidis, basi acutis vel acuminatis, apice rotundatis vel breviter late acuminatis, nervis utrinque circiter 12, subtus prominentibus; umbellis axillaribus, solitariis, breviter pedunculatis; fructibus paucis, carnosis, ovoideis, circiter 7 mm longis.

An erect shrub about 3 m high. Branches brownish or grayish, terete, or the younger ones somewhat compressed, the tips of the branches, leaf-axils, stipules, and petioles of the younger leaves with few to many, thin, small, ultimately deciduous, appressed, pale scales. Leaves elliptic to oblong-elliptic, coriaceous, shining, rather pale when dry, 8 to 12 cm long, 3.5 to 6 cm wide, the base acute or somewhat acuminate, the apex rounded or shortly and broadly acuminate; primary nerves about 12, prominent beneath, spreading, curved, anastomosing, the alternating secondary ones also prominent, the reticulations distinct; petioles 1.5 to 3 cm long; stipules oblong, rounded, 1.5 cm long, furfuraceous, deciduous. Flowers unknown. Fruit in solitary, axillary umbels, the peduncles about 8 mm long, with few small bracts at the apex, each peduncle bearing from three to five ovoid fruits about 7 mm long, 5 mm in diameter, glabrous, their pedicels about as long as the peduncles. Seeds very numerous, pale-brown, 0.5 mm long, densely and finely foveolate.

PALAWAN, Mount Pulgar, *For. Bur. 3871 Curran*, February, 1906, on forested slopes, altitude 700 to 1,300 m.

Possibly as closely allied to the Bornean *Urophyllum subaneurum* Stapf as to any other species, but quite distinct from that.

Urophyllum negrosense sp. nov.

Arbuscula erecta, ramulis foliis subtus ad nervos, stipulis bracteisque plus minus ciliato-hirsutis; foliis late oblongo-lanceolatis, submembranaceis, usque ad 18 cm longis, apice sensim subcaudato-acuminatis, basi acutis, nervis utrinque circiter 16; stipulis oblongis, membranaceis, usque ad 2.5 cm longis; floribus axillaribus, sessilibus, fasciculatis.

An erect shrub (*fide* Everett). Branches terete, brownish, glabrous or nearly so. Leaves broadly oblong-lanceolate, submembranaceous, 15 to

18 cm long, 4 to 5 cm wide, the apex gradually narrowed to the slender, subcaudate acumen, the base acute, rather pale when dry, shining on both surfaces, glabrous on the upper surface, beneath with numerous, pale, spreading or somewhat appressed ciliate hairs on the midrib and nerves, otherwise glabrous; nerves about 16 on each side of the midrib, prominent, curved-ascending, anastomosing near the margin, the primary reticulations distinct, subparallel; petioles 1 to 1.5 cm long, glabrous or slightly ciliate; stipules membranaceous, oblong, subpersistent, 2 to 2.5 cm long, rather densely ciliate on the back. Flowers few, axillary, fascicled, apparently sessile. Fruit fleshy, ovoid, about 1.3 cm long, somewhat villous, crowned by the ovate, obtuse calyx-lobes which are more or less villous and 5 to 6 mm long.

NEGROS, Himugaan River, in ravines at an altitude of about 50 m. *For. Bur. 5550 Everett* (type), October 25, 1906, the fruit green when collected; said to be abundant locally; Faraon, *For. Bur. 13574 Meyer & Foxworthy*, August, 1909.

A species probably closely allied to *Urophyllum streptopodium* Wall., but with quite different leaves and much larger persistent calyx-lobes.

VILLARIA Rolfe.

Villaria acutifolia (Elmer) comb. nov.

Gardenia acutifolia Elmer Leafl. Philip. Bot. 1 (1906) 6.

MINDANAO, District of Davao, Davao, *Copeland 437* (type); Padada, *Williams 2975*.

The original description of this species was based on two specimens, the first one cited being *Copeland 437*, which I assume to be the type of the species. The second specimen cited, *Ahern 457*, "457, Forestry Bureau, collected by J. F. Quadras," from Dinagat Island, is also a *Villaria*, and is probably referable to *V. philippinensis* Rolfe. The original description must be emended as follows: Leaves chartaceous, apex acuminate, base rounded or acute. Flowers mostly solitary, axillary, rarely in short, 3-flowered, cymes, the inflorescence and calyx puberulent (not glabrous), the peduncles in fruit not exceeding 2 cm in length, each subtended by two lanceolate, acuminate, puberulent bracts, no bracts or bracteoles above the base. Calyx puberulent, up to 1.5 cm long, sometimes 4-merous. The flowers were apparently described from immature buds, but the dissected material was not preserved, and there are no buds or open flowers left on the type sheet. Open flowers on Mr. Williams' specimen are white, the corolla tube cylindric, 4 mm long, the lobes 4 or 5, elliptic, rounded, 4 mm long, 2.5 mm wide, the throat pubescent. Anthers 4 mm long, inserted on the throat, not exserted; style 2 mm long, glabrous; stigma oblong, 4 mm long, 1.5 mm wide, felted-pubescent. The description of the fruit must be excluded as it was based on *Ahern 457*, and refers to *Villaria philippinensis*.

The species is well characterized by its usually solitary flowers, the pedicels bibracteate at the base, the inflorescence more or less puberulent, and especially by the calyx-lobes exceeding the corolla in length.

The form described by Mr. Elmer, l. c., as *Gardenia elliptica* is exactly the same as *Villaria littoralis* Vidal.

GOODENOVIACEÆ.

SCAEVOLA Linn.

Scaevola acuminatissima sp. nov. § *Enantiophyllum.*

Scandens, glabra, vel inflorescentiis plus minus pubescentibus; foliis oppositis, ovato-lanceolatis vel late oblongo-lanceolatis, membranaceis, nitidis, leviter distanter denticulatis, basi acutis, apice longissime caudato-acuminatis, usque ad 11 cm longis; pedunculis axillaribus, brevibus, saepe trifloris; floribus aurantiacis, 5-meris, circiter 2.5 cm longis.

A scandent herbaceous vine, nearly glabrous throughout, the stems brownish, slightly striate, up to 3.5 mm in diameter, the branches and leaves opposite. Leaves ovate-lanceolate to broadly oblong-lanceolate, membranaceous, shining, entirely glabrous, 6 to 11 cm long, 2 to 3 cm wide, the base acute, the apex gradually narrowed into a long, slender, straight or somewhat falcate, caudate acumen, the margins entire or distantly and slightly denticulate; nerves about 6 on each side of the midrib, slender, anastomosing, the reticulations lax; petioles 5 mm long or less. Peduncles axillary, solitary, 5 to 10 mm long, more or less appressed-pubescent, the axils of the stems at the insertion of the peduncles also usually pubescent, each peduncle bearing 3, rarely 5 flowers, the pedicels 5 mm long or less, the bracts at the apex of the peduncles narrow, up to 4 mm in length. Flowers yellow. Calyx-tube oblong, glabrous or nearly so, in anthesis 2 to 3 mm long, the lobes 5, lanceolate, acuminate, about 3.5 mm long, 1 mm wide. Corolla 2 to 2.2 cm long, nearly glabrous outside or with very few, scattered, appressed hairs, villous within, the lobes 5, lanceolate or oblong-lanceolate, acuminate, 6 to 9 mm long, 1.8 to 2 mm wide, 3-nerved, the corolla-tube 15-nerved. Filaments slender, glabrous, 8 to 9 mm long; anthers about 2 mm in length. Style glabrous, 13 mm long, the stigma flattened, 2 to 2.5 mm wide, slightly horned at the upper corners, surrounded by a cup 2 to 2.5 mm in diameter which is densely ciliate on the margins. Fruits oblong-ellipsoid, about 9 mm long, 3.5 mm in diameter, somewhat longitudinally sulcate, black when dry, glabrous.

MINDORO, Arunay River, *For. Bur. 12125* (type), *12133 Merritt*, May 8, 1908, in forests at an altitude of about 600 m.

A species allied to the Philippine *Scaevola dajoensis* Merr., of Jolo, *S. minahassae* Koord., of Mindanao and Celebes, *S. similis* Hemsl., of Celebes, *S. novo-guineensis* K. Schum., of New Guinea, *S. oppositifolia* Roxb., of Ternate, and *S. amboinensis* Miq., of Amboina. Specimens sent to Kew for comparison were reported as "nearest *S. novo-guineensis*, differing from it in having larger flowers and an almost glabrous corolla." Among the Philippine species it is manifestly allied to *S. dajoensis* Merr., but differs in its much larger flowers.

Scaevola mindorensis sp. nov. § *Enantiophyllum.*

Species praecedenti valde affinis, differt foliis pro rata latioribus, margine distincte sinuato-dentatis, subtus plus minus pubescentibus, ramulis leviter pilosis, inflorescentiis floribusque dense pubescentibus.

A scandent herbaceous vine similar to *Scaevola acuminatissima,* differing in the points above indicated. Branches brown or grayish, striate, pilose, the younger ones rather densely so. Leaves ovate-oblong, membranaceous, 5 to 7 cm long, 2 to 3 cm wide, base acute, apex slenderly subcaudate-acuminate, margins distinctly sinuate-dentate, the lower surface with numerous, short, scattered, spreading hairs, the upper surface glabrous or with very few hairs. Peduncles axillary, solitary, 1 to 2 cm long, densely pubescent, each usually bearing three flowers, and also two much reduced leaves at the apex, the pedicels about 5 mm in length, the bracteoles 1.5 mm long. Flowers yellow, 5-merous. Calyx-tube 4 mm long, rather densely pubescent, the lobes 5, lanceolate, about 5 mm long, 1.2 to 1.4 mm wide, acuminate. Corolla outside rather strongly pubescent, villous within, 2.2 cm long, the lobes 8 mm long, 2 to 2.5 mm wide, 3-nerved, the tube 15-nerved. Filamants glabrous. Style glabrous, 13 mm long, the cup surrounding the stigma not only densely ciliate on the margins, but also with numerous long white cilia on the outside.

MINDORO, Mount Sablayan, *For. Bur. 9756 Merritt,* March 2, 1908, on the exposed cleared summit at an altitude of about 1,000 m.

Specimens sent to Kew for comparison were reported as "nearest *S. similis* Hemsl., but with longer peduncles." It differs also from that species, as described, in its 5-merous, not 4-merous, much larger flowers and its different calyx-teeth.

Scaevola sericea Forst. Prodr. (1786) 89; Presl Rel. Haenk. 2 (1830) 57; DC. Prodr. 7 (1839) 506.

LUZON, *Haenke* in Herb. Mus. Königr. Böhmen, Prague: Province of Ilocos Sur, Salomague, *Merrill 339.*

This species is apparently much less common in the Philippines than is *S. koenigii* Vahl, and is to me sufficiently distinct from Vahl's species to warrant being given specific rank, although recent authors have treated it as a synonym of *S. koenigii* Vahl. It differs from S. *koenigii* in being pubescent throughout, the inflorescence very densely so. I have what is apparently the same form from Java, and from the Caroline Islands, Yap, *Volkens 133,* distributed as *S. koenigii* Vahl.

Scaevola micrantha Presl Rel. Haenk. 2 (1830) 59; Miq. Fl. Ind. Bat. 2 (1856) 582; F.-Vill. Nov. App. (1880) 121.

LUZON, Province of Albay, on barren rocky hills, altitude about 120 m, near Calanaga, Batan Island, *Bur. Sci. 6289 Robinson,* August 23, 1908. I have also examined the type in the herbarium of the Museum des Königreichs Böhmen, Prague, and find it to be quite the same as the specimen collected by Doctor Robinson. Haenke's specimen probably came from what is now the Province of Albay, or from Sorsogon.

The species is a very distinct one, as indicated by Presl. It is, perhaps, most closely allied to *S. plumieri* Vahl, but its flowers are less than 1 cm in length.

Scaevola pedunculata sp. nov.

Species S. micranthae affinis, sed differt ramulis foliis inflorescentiisque glabris, axillis barbatis exceptis, foliis longioribus, cymis longe pedunculatis, floribus paulo longioribus.

A shrub 2 to 4 m high, erect, nearly glabrous, axils excepted. Branches terete, smooth, olivaceous, glabrous, the axils of the leaves and peduncles densely bearded with long white hairs. Leaves distant, scattered, chartaceous or submembranaceous, narrowly oblong-obovate or oblong-oblanceolate, glabrous and shining on both surfaces, 6 to 10 cm long, 1.5 to 3 cm wide, the apex broad, rounded or very slightly and obscurely acuminate, gradually narrowed from the upper third to the base, the petiolar part about 1 cm long; nerves about 8 on each side of the midrib, indistinct. Cymes axillary, solitary, as long as the leaves, glabrous except the densely bearded axils of the branches and bracts, the peduncles about 5 cm long, each bearing at its apex two linear-lanceolate to subspatulate 1 to 1.5 cm long bracts, and four primary branches about 1.5 cm long, the branches in turn bracteate at their apices and bearing usually four shorter branchlets, the ultimate ones bearing usually three flowers, a central sessile one, and two lateral pedicellate ones, the bracteoles about 5 mm long. Flowers white. Calyx 2.5 mm long, glabrous, the five teeth broadly ovate, acute, about 1 mm long. Corolla 1 cm long, slightly curved, somewhat pubescent outside but not densely so, pilose inside, the lobes about 4 mm long, with broad, thin, infolded margins. Style slightly silky, the indusium surrounding the stigma densely ciliate. Drupe glabrous, obscurely costate, about 3 mm long.

PALAWAN, on rocky river banks, altitude about 175 m, Mount Victoria, *Bur. Sci. 744 Foxworthy*, March 25, 1906.

A species manifestly allied to *S. micrantha* Presl, but apparently sufficiently distinct, recognizable by its somewhat larger leaves, long peduncled cymes, the axils of the peduncles, leaves, bracts and bracteoles densely bearded with long white hairs, the plant otherwise glabrous or nearly so.

Scaevola pedunculata var. **mollis** var. nov.

A typo differt omnibus partibus dense breviter pubescentibus.

PALAWAN, Mount Victoria, altitude about 1,000 m, *Bur. Sci. 700 Foxworthy*, March 23, 1906.

The specimen on which the above variety is based in all essential characters is the same as the type, differing in being softly and rather densely pubescent throughout with short grayish hairs. The flowers appear to be quite the same as in the species, but the fruits are slightly pubescent. Additional material may show this form to be worthy of specific rank, but it is considered best for the present to consider it as a variety only. It is apparently more closely allied to *S. micrantha* Presl than is the species, but differs from Presl's species in all the characters indicated for *S. pedunculata* except in its pubescence, and in this it is very decidedly more pubescent than is *S. micrantha* Presl. Logically, if *Scaevola sericea* Forst. is to be considered specifically distinct from *S. koenigii*

Vahl, then perhaps the present variety should be given specific rank. However, the material on which the species and the variety are based, came from the same region, although at different altitudes, and was collected on the same date, and the pubescence of the latter may be a character largely due to altitude.

COMPOSITÆ.

VERNONIA Schreb.

Vernonia elmeri sp. nov.

Gynura angulosa Elmer Leafl. Philip. Bot. 1 (1906) 146, excl. syn., non DC.

Herba scandens, usque ad 3 m alta, foliis subtus, ramulis, inflorescentiisque leviter pubescentibus; foliis alternis, petiolatis, oblongo-ovatis vel lanceolato-ovatis, valde acuminatis, margine distanter denticulatis; inflorescentiis terminalibus, corymboso-paniculatis, capitulis pedunculatis, circiter 1 cm longis; floribus purpureis.

A scandent herbaceous plant reaching a height of at least 3 m. Stems and branches terete, striate, appressed-pubescent with grayish hairs. Leaves alternate, oblong-ovate to lanceolate-ovate, or the upper ones nearly lanceolate, 4 to 8 cm long, 1 to 3 cm wide, the upper ones often smaller, chartaceous or submembranaceous, gradually narrowed into the sharply acuminate apex, the base acute or broad and rounded, the margins with distant, small teeth, somewhat pubescent with scattered hairs on both surfaces, or nearly glabrous above, glandular-punctate beneath; petioles 3 to 4 mm long, pubescent. Panicles terminal, corymbose, slightly pubescent. Heads comparatively few, about 1 cm long. Involucral bracts 5- or 6-seriate, the outer ones gradually smaller, and the outermost almost linear, 1 to 1.5 mm long, all pubescent, the innermost ones about 5 mm long, 1 to 1.3 mm wide, apiculate-acuminate, slightly keeled. Disk at first paleaceous with short scales, ultimately quite glabrous. Flowers all hermaphrodite, homogamous, tubular, purple. Achenes about 1 mm long, slightly pubescent, obscurely ribbed; pappus white, copious, about 6 mm long, with a few very short hairs in the outer series. Corolla about 9 mm long, cleft at the apex into 5, oblong-lanceolate, about 3 mm long lobes; style exserted, the arms 2 mm long; anthers 2.5 mm long, apex blunt or acute, hyaline, base shortly cleft.

PALAWAN, Separation Point, *Merrill 793*, February, 1903; San Antonio Bay, *Merrill 5256*, October, 1906; Mount Victoria, *Bur. Sci. 703 Foxworthy*, March, 1905. LUZON, Province of Nueva Vizcaya, *Bur. Sci. 8196 Ramos*, May, 1909, MINDANAO, Lake Lanao, *Mrs. Clemens 915*, January, 1907.

This species is apparently closely allied to *Vernonia cinerea* (L.) Less., but is at once distinguishable by its much larger size, scandent habit, and larger leaves and heads. In floral structure it is exceedingly similar to that species. It was referred by Mr. Elmer to *Gynura angulosa* DC., but does not remotely resemble that species, and is, moreover, not a member of the *Senecioneae*. The structure of the involucre at once distinguishes it from *Gynura* and allied genera. More material is necessary to dispose of *Gynura sarmentosa* Elm., *l. c.* (non DC.!), as the specimen referred to it by that author, *Copeland 1258*, is very similar to some

forms of the species above described, and is certainly cogeneric, if not cospecific with it; the specimen is, however, young, and additional material may show more marked points of differentiation.

Vernonia acrophila sp. nov. § *Strobocalyx.*

Arbor parva, circiter 5 m alta, subglabra; foliis coriaceis, oblongo-ovatis, acuminatis, circiter 3.5 cm longis; corymbis terminalibus, plus minus congestis, capitulis 3- vel 4-floris, squamis imbricatis, plus minus puberulis, margine obscure ciliatis; achenio 2 mm longo, glanduloso.

A small tree about 5 m high, the trunk 15 cm in diameter, subglabrous. Branches short, stiff, the ultimate ones more or less crowded, black or grayish, lenticellate, glabrous or nearly so. Leaves oblong-ovate, coriaceous, about 3.5 cm long, 1.2 to 1.5 cm wide, the apex shortly acuminate, acumen blunt, base acute or acuminate, the margins somewhat reflexed, glabrous, dark-colored when dry; nerves 5 or 6 on each side of the midrib, distant, anastomosing, distinct beneath; petioles slender, 4 to 6 mm long. Inflorescence terminal, somewhat congested, subglabrous. Involucral bracts several-seriate, the outer ones ovate, obtuse, 1 mm long or less, the inner ones gradually longer, the innermost oblong, 2.5 to 3 mm long and deciduous, all slightly puberulent or nearly glabrous, the margins obscurely ciliate. Achenes 3 or 4 in each involucre, 2 mm long, irregularly and obscurely angled, and with numerous, scattered, waxy glands; pappus-hairs stiff, scabrid, about 24, 4 mm long, with a number of shorter supplementary ones intermixed, these 1 mm long or less.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8057 Curran & Merritt*, October 13, 1907, in the elfinwood, exposed peaks, above an altitude of 2,000 m.

As *Vernonia arborea* Ham. is interpreted by Hooker f., perhaps the present form would be included, possibly as a variety or as a reduced form. It differs so strongly in its very much reduced leaves and in being nearly glabrous throughout, that it has been considered to be worthy of specific rank.

Vernonia lancifolia sp. nov. § *Strobocalyx.*

Vernonia arborea Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 138, non Ham.

Arbor subglabra 4 ad 5 m alta; foliis lanceolatis, valde acuminatis, usque ad 12 cm longis, 2.5 cm latis, coriaceis vel subcoriaceis, glabris, subtus glandulosis, nervis utrinque 9 ad 12, distinctis; squamis puberulis; achenio 2 ad 2.4 mm longo.

A tree 4 to 5 m high, nearly glabrous throughout. Branches grayish to nearly black, terete, glabrous, the ultimate branchlets sometimes pubescent. Leaves coriaceous, lanceolate, 5 to 12 cm long, 1.5 to 2.5 cm wide, glabrous, somewhat shining above when dry, the apex sharply subcaudate-acuminate, the base acute or acuminate, the lower surface with numerous, minute, yellow, shining, waxy glands; nerves 9 to 12 on each side of the midrib, beneath distinct, anastomosing, the reticulations rather lax; petioles slender, 3 to 10 mm long. Inflorescence terminal, 6 to 12 cm in diameter, glabrous or nearly so, or the branchlets somewhat pubescent.

Outer involucral scales suborbicular, less than 1 mm long, pubescent, the inner ones gradually longer, the innermost less pubescent, deciduous, 2 to 2.5 mm long, obtuse. Achenes 3 or 4 in each involucre, when mature nearly terete, when young more distinctly angled, 2 to 2.4 mm long, sometimes distinctly waxy-glandular, at other times with very few, scattered, short hairs; pappus bristles stiff, about 30, 4 to 4.5 mm long, with numerous shorter ones less than 1 mm long intermixed.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3200*, *Williams 420* (type), *Elmer 6695*, *Whitford s. n.*, summit of the mountain, altitude about 1,400 m: Province of Tayabas, Mount Malaraya, *For. Bur. 7841*, *7844 Curran & Merritt*, November, 1907, altitude about 1,000 m.

A species like the preceding allied to *Vernonia arborea* Ham., differing in being nearly glabrous and especially in its much narrower, smaller, lanceolate leaves which are glandular beneath. It is manifestly allied to the preceding species but has very much larger leaves.

BLUMEA DC.

Blumea confertiflora sp. nov.

Herba erecta, robusta, circiter 1 m alta; foliis sessilibus, basi angustatis, plus minus decurrentibus, oblongo-ellipticis vel oblongo-obovatis, usque ad 12 cm longis, subcoriaceis, breviter acuminatis, margine irregulariter sinuato-denticulatis; capitulis circiter 1 cm diametro, in ramulis ultimis densissime congestis, sessilibus vel breviter pedunculatis.

An erect, robust herb about 1 m high. Stems stout, dark-brown or purplish, longitudinally striate, more or less pubescent, apparently unbranched, except the inflorescence. Leaves sessile, oblong-elliptic to oblong-obovate, the apex shortly acuminate, the base gradually narrowed, the margins irregularly sinuate-denticulate with small teeth, not at all lobed, 6 to 12 cm long, 2.5 to 4 cm wide, coriaceous or subcoriaceous, slightly shining when dry, somewhat pubescent with short hairs on both surfaces, paler beneath; nerves about 9 on each side of the midrib; leaf-bases sometimes decurrent along the stem for 2 to 3 cm. Panicle-branches rather few, the lower ones up to 40 cm long and subtended by leaves, ascending, the secondary ones very short, mostly less than 1 cm long, pubescent, each bearing numerous, densely disposed heads which are sessile or shortly peduncled. Heads 8 to 9 mm long, about 1 cm in diameter. Involucral bracts many-seriate, the outer ones oblong-ovate to oblong-lanceolate, about 2 mm long, 1.2 mm wide, pubescent, the inner ones gradually longer, the innermost about 6 mm long, 0.5 to 1 mm wide, slightly hairy, acuminate, the margins toward the apex more or less ciliate. Flowers yellow, heterogamous, the outer ones indefinite (more than 100), pistillate; achenes 1 to 1.2 mm long, somewhat angled, slightly hairy; pappus hairs about 20, white, slender, scabrid, 5 mm long; corolla cylindric, slender, 5 mm long, minutely 3-toothed; style-arms slender, exserted, less than 1 mm long. Disk-flowers perfect, about 14 in each

head; corolla 5 mm long, enlarged above, the teeth 5, ovate, acute or obtuse, less than 0.5 mm long; anthers 2 mm long, the tails very slender, less than 0.55 mm in length; style-arms stout, blunt, 0.5 mm long. Disk pitted, glabrous or with very few, short, scattered hairs.

MINDORO, *For. Bur. 11027 Merritt*, March, 1908 (type), the specimen from the southwestern part of the island; also *For. Bur. 11016* Merritt from Mount Sablayan, exposed summit of the mountain at edge of the forest, altitude about 970 m, March 2, 1908.

A species characterized by its comparatively large heads which are glomerate on the ultimate panicle-branches. Among the Philippine species it is probably most closely allied to *Blumea mindanaensis* Merr.

Blumea longipes sp. nov.

Herba erecta ramosa, usque ad 80 cm alta; foliis oblongo-obovatis vel oblongo-oblanceolatis, submembranaceis, usque ad 10 cm longis, petiolatis, acutis vel rotundatis, basi sensim angustatis, plus minus repando-dentatis, vix lobatis; paniculis diffusis, ramis ramulisque glandulosis, pedunculis solitariis, gracilibus, usque ad 2.5 cm longis; capitulis 0.8 cm longis.

An erect, much branched, aromatic herb about 80 cm in height. Stems stout, brownish or purplish, slightly striate, more or less puberulent, ultimately nearly glabrous, 5 mm in diameter or less. Leaves oblong-obovate to oblong-oblanceolate, submembranaceous, the apex rounded or acute, the base gradually narrowed, the margins somewhat repand-dentate but not lobed, those of the stem 7 to 10 cm long, 1.5 to 3 cm wide, those of the branches often much smaller and usually more pubescent. Panicles rather diffuse, the branches and branchlets slender, mostly densely glandular and often also somewhat pubescent, the peduncles solitary, 0.5 to 2.5 cm long, slender, glandular. Heads 7 to 8 mm long, about 1 cm in diameter. Involucral bracts many-seriate, the outer ones about 2 mm long, 0.5 mm wide, the inner gradually longer, the innermost 5 mm long and 0.5 mm wide, the outer ones usually prominently glandular, the innermost ones ciliate above and slightly glandular in the median portion. Flowers yellow, heterogamous, the outer ones pistillate, indefinite, many-seriate; achenes minute, 1 mm long, slightly angled, very obscurely pubescent with few, short, scattered hairs; pappus hairs slender, white, minutely scabrid, 3 mm long; corolla slender, cylindric, 4 mm long, very obscurely 3-toothed; style exserted, the arms filiform, less than 1 mm long. Disk-flowers perfect, about 14; achene like that of the pistillate flowers but stouter; corolla enlarged above, 5-toothed, the teeth 0.5 mm long, acute, slightly glandular; stamens 2 mm long, the tails minute, less than 0.5 mm long; style-arms about 0.8 mm long, slender. Disk glabrous, pitted.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 893* (type), January, 1907; also unnumbered specimens collected in May and June.

A species growing in the open grass lands about Lake Lanao, characterized by its very glandular inflorescence and by its long-peduncled heads.

Blumea mindanaensis sp. nov.

Herba erecta vix vel parce ramosa, stricta, usque ad 1 m alta; foliis sessilibus, oblongis vel oblongo-obovatis, subcoriaceis, scabridis, plus minus pubescentibus, margine irregulariter denticulatis; capitulis in ramuis plus minus congestis, circiter 1.7 cm diametro.

An erect stout herb about 1 m high, slightly or not at all branched, except the inflorescence. Stems stout, brown or purplish, striate, more or less pubescent, 5 to 7 mm in diameter. Leaves sessile, oblong to oblong-obovate, 6 to 12 cm long, 1.5 to 3.5 cm wide, subcoriaceous, somewhat shining when dry, scabrid, the upper surface often supplied with numerous, small, white dots, beneath somewhat pubescent, the apex acute or slightly acuminate, the base acute, the margins distantly and irregularly denticulate, not at all lobed or sinuate. Panicles about 40 cm long, the lower branches sometimes 15 cm in length, often much smaller, all parts rather densely brown-pubescent. Heads somewhat crowded, shortly peduncled, 10 to 12 mm long, 15 to 18 mm in diameter, the involucral bracts often purplish. Bracts several-seriate, the outer ones ovate-lanceolate, acuminate, about 2 mm long, rather strongly pubescent, the inner gradually larger, the innermost 8 mm long, 1 mm wide, ciliate on the margins toward the apex. Flowers yellow, heterogamous, the outer ones indefinite (more than 100), pistillate; achenes slender, 1 mm long, glabrous or with very few scattered hairs; pappus-hairs about 20, white, slender, minutely scabrid, 6 mm long; corolla cylindric, slender, 7 mm long, obscurely 3-toothed; style-arms exserted, slender, 1 mm long. Disk-flowers perfect, about 11; achenes like those of the pistillate flowers but stouter; corolla 6 mm long, enlarged above, 5-toothed, the teeth oblong-ovate, acute, 0.5 mm long; stamens 2 mm long, minutely tailed at the base; style slightly exserted, the arms 0.5 mm long, slender. Disk glabrous or with very few, short, scattered hairs, pitted.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 736* (type), November, 1906, and also unnumbered specimens collected in March, 1907, and in September, 1907.

A species well characterized by its comparatively large heads which are densely disposed, its erect, strict habit, and sessile, scabrid leaves. It is probably allied to *Blumea chinensis* Less., and among the Philippine species most closely allied to *B. incisa* (Elm.) Merr., differing from the latter notably in its leaf characters.

Blumea ramosii sp. nov.

Species B. sericanti Hook. f. affinis, sed differt foliis multo majoribus, usque ad 16 cm longis, late oblongo-oblanceolatis, capitulis pedunculatis.

An erect, unbranched, suffrutescent plant at least 80 cm high, the stem stout, terete, pubescent, mostly covered with the persistent, densely arranged, petiole-bases, this part of the stem about 20 cm long, the leaves crowded above this naked portion, subtending the inflorescence. Leaves subcoriaceous, sessile, crowded, broadly oblong-oblanceolate, 11 to 16 cm

long, 3.5 to 5 cm wide, the apex acute, the base gradually narrowed, slightly clasping, the margins rather finely denticulate, the upper surface with numerous, somewhat stiff hairs more or less thickened at the base, the lower surface very densely covered with long, grayish, silky hairs; nerves about 12 on each side of the midrib. Panicles terminal, about 40 cm long, the lower branches 10 cm long or more, often subtended by reduced leaves, the rachis and branches pilose. Heads somewhat racemosely arranged, 9 to 10 mm long, about 12 mm in diameter, their peduncles 3 to 10 mm long. Involucral bracts many-seriate, the outer ones ovate to oblong, acuminate, 1 to 2 mm long, the inner gradually longer, the innermost ones linear-oblong, 6 to 7 mm long, 1 mm wide, the intermediate ones somewhat wider, all somewhat pubescent on the back, more or less 1-nerved, the margins, especially above, more or less ciliate. Receptacle glabrous, somewhat pitted. Flowers heterogamous, the outer ones pistillate, many-seriate, about 40 in each head, yellow, the achenes slender oblong, pubescent, obscurely angled, 1 to 1.2 mm long; pappus-hairs about 30, white, slender, scabrid, 4.5 mm long; corolla-tube slender, cylindric, 4 mm long, obscurely 3-toothed; style-arms exserted, slender, 1 to 1.5 mm long. Disk-flowers perfect, about 11 in each head; achenes like those of the pistillate flowers but stouter; corolla 5.5 mm long, enlarged above, 5-toothed, the teeth ovate, acute, nearly 1 mm long; anthers 2 mm long, apex appendiculate, base with two minute, slender, 0.5 mm long tails; style exserted, the arms 0.5 mm long, stout, truncate.

LUZON, Province of Zambales, Mount Tapulao, *Bur. Sci. 5089 Ramos*, December 14, 1907.

A species apparently closely allied to *Blumea sericans* Hook. f., and to *B. hieracifolia* DC., but so far as I can determine from the material and descriptions available here, distinct from both. It is characterized by its minutely toothed and very densely silky leaves, suffrutescent stems, the lower portion leafless and more or less covered with persistent petiole-bases. In many respects it appears to agree with *Inula* § *Cappa* as closely as with *Blumea*, and may eventually have to be referred to the former genus. The characters by which *Inula* § *Cappa* is separated from *Blumea* do not appear to me to be well defined.

INDEX TO PHILIPPINE BOTANICAL LITERATURE, VI.

By E. D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

Baker, J. G. Handbook of the Amaryllidaceae including the Alstroemerieae and Agaveae (1888) XII+216.

Sixty-one genera are recognized, and all the species known to the author are described. Very few species are definitely credited to the Philippines, but several of those considered are found in the Archipelago, especially as introduced and cultivated plants. Indigenous and endemic species are very few in the Philippines. Two endemic species of *Crinum* are admitted, *C. cumingii* Baker and *C. gracile* E. Meyer; I have seen the types of both and consider them referable to a single species. *Eurycles sylvestris* Salisb. is the only other species definitely credited to the Philippines.

Bargagli-Petrucci, G. Le specie de Pisonia della Regione dei Monsoni. *Nuovo Giorn. Bot. Ital.* N. S. **8** (1901) App. 603–625, *t. 4.*

Twenty-one species are recognized, of which two are definitely recorded from the Philippines, *Pisonia excelsa* Bl., and *P. aculeata* Linn. Several additional species have been found in the Archipelago, *P. longirostris* T. & B., *P. alba* Span. (cult.), and apparently some undescribed forms.

Beccari, O. New or Little-known Philippine Palms. *Leafl. Philip. Bot.* **2** (1909) 639–650. (Article 36.)

Seven species are enumerated including the following described as new: *Areca ipot, Pinanga negrosensis, P. rigida, Heterospathe elmeri,* and *Calamus elmerianus.*

Beccari, O. Asiatic Palms – Lepidocaryeae, Part 1. The species of Calamus. *Ann. Bot. Gard. Calcutta* **11** (1908) 1–578; *plates 231,* (folio).

A consideration of all the species of the genus known to the author, in which the following 17 Philippine representatives are described and figured: *Calamus mollis* Blanco, *C. meyenianus* Schauer, *C. blancoi* Kunth, *C. cumingianus Becc., C. ornatus* Bl. var. *philippinensis* Becc., *C. merrillii* Becc. n. sp., *C. moseleyanus* Becc., *C. spinifolius* Becc., *C. trispermus* Becc., *C. manillensis* H. Wendl., *C. microsphaerion* Becc., *C. ramulosus* Becc., *C. vidalianus* Becc., *C. siphonospathus* Mart. with the varieties *farinosus, sublaevis, oligolepis (minor), oligolepis (major),* and *polylepis* Becc., *C. microcarpus* Becc., *C. dimorphacanthus* Becc., and *C. discolor* Mart. Sixteen of the seventeen Philippine species are endemic, and the seventeenth (*C. ornatus* Bl.), Malay Peninsula, Sumatra, Java, and Borneo, is represented in the Philippines by an endemic variety.

Brotherus, V. F. Musci Novi Philippinenses I. *Leafl. Philip. Bot.* **2** (1909) 651–658. (Article 37.)

The following species are described as new: *Campylopus calodictyon*, *Fissidens elmeri*, *Syrrhopodon macro-tristichus*, *Webera integerrima*, *W. elmeri*, *Symphysodontella subulata*, *Symphysodon subneckeroides*, *Distichophyllum elmeri*, *Hypopterygium delicatulum*, *Cyathophorum philippinense*, and *Pleuropus luzonensis*.

Castracane degli Antelminelli, F. Report on the Diatomaceae collected by H. M. S. *Challenger* during the years 1873–1876. Rept. Voy. H. M. S. *Challenger*, Botany **2** (1886) III+178, pls. 1–30.

The following are described from Philippine waters as new: *Amphora decora*, *A. philippinica*, *Pinnularia raëana*, *Navicula mammalis*, *N. decipiens*, *N. mirabilis*, *Glyphodesmis murrayana*, *G. challengerensis*, *G. margaritacea*, *Synedra capitulata*, *S. philippinarum*, *S. fimbriatum*, *Cyclophora tenuis*, *Surirella dives*, *S. multicostata*, *Campylodiscus zebuanus*, *C. lepidus*, *C. humilis*, *C. philippinarum*, *C. nitens*, *C. anceps*, *Nitzschia plana* var. *zebuana*, *N. obesa*, *N. vermiculata*, *Stephanophyxis kittoniana*, *Lauderia pumila*, *Rutilaria tulkii*, *R. edentulata*, *Biddulphia reticulata* var. *inermis*, *B. pellucida*, *Triceratium pulvillus*, *T. coronatum*, *T. grunowianum*, *T. insutum*, *Stictodiscus radiatus*, *S. radfordianus*, *S. affinis*, *S. reticulatus*, *S. margaritaceus*, *Omphalopelta shrubsoliana*, *Coscinodiscus variolatus*, *C. decrescens*, and *C. ? rudis*. A few additional species previously described by various authors are credited to the Philippines.

Christ, H. Some New Species of Malesian and Philippine Ferns. *Journ. Linn. Soc. Bot.* **39** (1909) 213–215.

Five species are described, of which two, *Alsophila matthewii* Christ, and *Trichomanes subtrifidum* Matthews & Christ are from Mount Maquiling, Luzon.

Copeland, E. B. Pteridophytes of the Horn of Negros. *Leafl. Philip. Bot.* **2** (1908) 387–426. (Article 19.)

One hundred and eighty species and varieties are enumerated from the Cuernos Mountains, southern Negros, the following being described as new: *Polystichum horizontale* Presl, var. *sordidum*, *Lomagramma pteroides* J. Sm., var. *subcoriacea* and var. *negrosensis*, *Dennstaedtia articulata*, *Lindsaya monosora*, *Plagiogyria tuberculata* Copel. var. *gracilis*, *Loxogramme dimorpha*, *Polypodium negrosense*, *Cyathea heterochlamydea*, *C. fructuosa*, and *Alsophila elmeri*. Numerous notes on distribution, habitats, and synonymy are given, as well as a key to the Philippine species of *Elaphoglossum*.

DeCandolle, Aug. Revision of the Philippine Species of Elaeocarpus. *Leafl. Philip. Bot.* **2** (1909) 634–638. (Article 35.)

Sixteen species are recognized with an analytical key, with four additional doubtful ones. *E. verruculosus*, *E. procerus*, and *E. elmeri* are described as new, and *E. fissistipula* Miq., is credited to the Philippines for the first time. *E. venosus* C. B. Rob. (1908) was overlooked, and several additional species have since been described.

Desvaux, A. N. Observations sur la famille des Légumineuses. *Ann. Sci. Nat.* **9** (1826) 404–431.

Tephrosia dichotoma is described as new from the Philippines; from the description it is the same as the species later described by Vogel as *T. luzoniensis*.

Dubard, M. Note sur les Palaquium des Philippines. *Bull. Mus. Hist. Nat. Paris* **15** (1909) 379–384.

Eighteen species of *Palaquium* are enumerated of which *P. vidalii* Pierre and *P. merrillii* Dubard are described as new, and *P. obovatum* (Griff.)

Engl., is credited with doubt to the Archipelago. Critical notes are given on the other species enumerated.

Elmer, A. D. E. Some Interesting Lauraceae. *Leafl. Philip. Bot.* **2** (1908) 375–384. (Article 17.)

This is the first paper of the second volume of the "Leaflets of Philippine Botany," but the sequence of both articles and pagination is continuous from volume 1. The present paper contains the descriptions of the following new species: *Actinodaphne microphylla, Endiandra arborea, Litsea plateaefolia, L. quercoides, L. membranacea, L. tayabensis, L. griseola* (=*L. garciae* Vid.), *Neolitsea intermedia,* and *Persea leytensis; Machilus philippinensis* Merr. is transferred to *Persea.*

Elmer, A. D. E. Six Undescribed Species of Macaranga. *Leafl. Philip. Bot.* **2** (1908) 427–434. (Article 20.)

The following Philippine species are described: *Macaranga caudatifolia, M. cuneata, M. cuernosensis, M. sylvatica, M. loheri* (=*M. cumingii* Muell.-Arg.), and *M. ramiflora.*

Elmer, A. D. E. Six New Myrsinaceae. *Leafl. Philip. Bot.* **2** (1908) 439–444. (Article 22.)

The following Philippine species are described: *Ardisia punctata, A. mezii, Discocalyx linearifolia, D. psychotrioides, D. montana,* and *Maesa embelioides.*

Elmer, A. D. E. Synopsis of Rubus. *Leafl. Philip. Bot.* **2** (1908) 445–462. (Article 23.)

The paper applies only to the Philippine species, of which 17 are recognized, the following being described as new: *Rubus mearnsii, R. brevipetalus, R. zambalensis,* and *R. fraxinifolius* Poir., var. *haightii.* The species considered as *R. rugosus* Sm., is not Smith's species but the recently described *R. elmeri* Focke. Descriptions of all the species considered are given, with an analytical key.

Elmer, A. D. E. Three Score of New Plants. *Leafl. Philip. Bot.* **2** (1908) 463–525. (Article 24.)

This paper consists of the descriptions of the following species: *Isachne stricta, Celtis rubrovenia, Elatostema laxum, E. hastatum, E. delicatum, E. spinulosum, Loranthus cuernosensis, L. bicoloratus, Notothixos philippinensis, Goniothalamus magnificus, Hydrangea glandulosa, Pygeum fragrans, Melicope odorata* (=*M. luzonensis* Engl.), *Zanthoxylum diabolicum, Evodia pergamentacea, Micromelum curranii, Eurycoma dubia, Canarium nervosum, Dichapetalum glabrum, D. obovatum, Elateriospermum paucinervium, Sapium crassifolium, Claoxylon arboreum, Antidesma microcarpum, Trachelospermum philippinense, Glycosmis angularis, Turpinia ovalifolia, Urandra fuliginea, Meliosma sylvatica, Cissus suberosa, Leea negrosensis, Halconia negrosensis, Sterculia multistipularis, Saurauia avellana, S. negrosensis, Gordonia welbornii, Eurya auriculata* (=*E. amplexicaulis* Moore), *Garcinia pinnatinervia, Calophyllum hibbardii, Viola toppingii, Boerlagiodendron serratifolium, Diospyros reticulata* (=*D. curranii* Merr.), *D. brideliaefolia, Symplocos fragrans, S. curtiflora, S. angularis, Jasminum ixoroides* (=*J. bifarium* Wall.), *Anodendron corymbosum, Callicarpa subglandulosa, Clerodendron klemmei, C. preslii, Scutellaria marivelensis, Hypoestes linearis, Tricalysia negrosensis, Lasianthus humilis, Psychotria negrosensis, P. cuernosensis, P. microphylla, Ophiorrhiza caespitulosa,* and *Hedyotis leucocarpa.*

Elmer, A. D. E. The Genus Itea. *Leafl. Philip. Bot.* **2** (1908) 527–529. (Article 25.)

A discussion of the Philippine species only, two being considered and described as new, *Itea maesaefolia,* and *I. luzonensis* (*I. macrophylla* of other Philippine authors).

Elmer, A. D. E. A Fascicle of South Negros Figs. *Leafl. Philip. Bot.* **2** (1908) 531–551. (Article 26.)

Thirty-five species are enumerated of which the following are described as new: *Ficus hallieri* Merr. (insufficient diagnosis), *F. everettii*, *F. benguetensis* Merr., var. *negrosensis*, *F. cervina*, *F. cuernosensis*, *F. crassitora*, and *F. garciae*. *Ficus ruficaulis* var. *paloensis* Elm. is raised to specific rank.

Elmer, A. D. E. Gesneriaceae from the Cuernos Mts. *Leafl. Philip. Bot.* 2 (1908) 553–567. (Article 27.)

Seventeen species are enumerated, of which the following are described as new: *Cyrtandra maesifolia*, *C. fragilis*, *C. attenuata*, *C. pallida*, *C. antoniana*, *Rhynchoglossum spumosum*, *Trichosporum cuernosense*, and *T. truncatum*.

Elmer, A. D. E. A Score of New Plants. *Leafl. Philip. Bot.* **2** (1909) 573–594. (Article 29.)

Consists of the descriptions of the following species: *Mapania lucbanensis*, *M. banahaensis*, *Aphananthe negrosensis*, *Gymnacranthera negrosensis*, *Weinmannia negrosensis*, *Parinarium coccineum*, *Sabia reticulata*, *Saurauia panduriformis*, *Eugenia incrassata*, *E. robinsoni*, *E. vidaliana*, *Schefflera paniculata* (=*S. foetida* Merr.), *Linociera rubrovenia*, *Carruthersia imberbis*, *C. hirsuta*, *Erycibe dubia*, *Eranthemum fruticosum*, *Hemigraphis sublobatum*, *Psychotria diffusa cervina*, and *Pratia ovata*.

Elmer, A. D. E. Synopsis of Fagraea. *Leafl. Philip. Bot.* **2** (1909) 595–601. (Article 30.)

Eight species are considered of which the following are described as new: *F. negrosensis*, and *F. cuernosensis*. The paper applies only to Philippine forms.

Elmer, A. D. E. Synopsis of Artocarpus. *Leafl. Philip. Bot.* **2** (1909) 609–626. (Article 32.)

The paper considers only the Philippine species, seventeen being recognized, of which the following are described as new: *Artocarpus nigrescens*, *A. communis* var. *blancoi*, and *A. treculiana*. A key is given to the species recognized.

Elmer, A. D. E. The Genus Hydrocotyle. *Leafl. Philip. Bot.* **2** (1909) 627–629. (Article 33.)

The paper applies only to the Philippine species, five being recognized, with an analytical key; *H. benguetensis* and *H. delicata* are described as new.

Elmer, A. D. E. A New Grewia. *Leafl. Philip. Bot.* **2** (1909) 631, 632. (Article 34.)

Grewia negrosensis is described as new.

Engler, A. Addimentatum ad Araceas-Pothoideas. *Pflanzenreich* **37** (1908) 2, 3; II 138, 139.

This consists of a description of the genus *Epipremnopsis*, which is first made monotypic, all specimens being referred to *E. media* (Z. & M.) Engl., extending from India to Malaya, and the Philippines. In the "Addimentum II," 183, however, the Philippine form is separated as a distinct, endemic, Philippine species, as *E. huegeliana* (Schott) Engl.

Engler, A. & Krause, K. Araceae-Monsteroideae. *Pflanzenreich* **37** (1908) 1–138.

The following species are credited to the Philippines: *Raphidophora perkinsiae* Engl., endemic, *R. philippinensis* sp. nov., *R. copelandii* Engl., endemic, *R. merrillii* Engl., endemic, *R. warburgii* Engl., endemic, *Epipremnum pinnatum* (L.) Engl., Indo-Malaya to Polynesia, *E. truncatum* sp. nov., *E. elmeria-*

num Engl. sp. nov., *Scindapsus hederaceus* Schott, Cochin China and Malaya, *S. curranii* sp. nov., and *Spathiphyllum commutatum* Schott, Philippines and Celebes. Four of the new Philippine species of *Raphidophora*, *Epipremnum*, and *Scindapsus* are described in the "Additamentum," pages 137, 138.

Finet, E.-A. Orchidées nouvelles ou peu connues. *Bull. Soc. Bot. France* XIV **9** (1909) 97–104.

Liparis disticha Lindl. var. *latilabris* Finet is the only Philippine form considered, the variety, based on *Cuming 2099*, being described as new.

Focke, W. O. Species Ruborum. Monographiae generis Rubi Prodromus, Pars I. *Bibl. Bot.* **72** (1910) 1–120, figs. 53.

The following Philippine species are considered: *Rubus pectinellus* Maxim., Japan and Luzon; *R. copelandi* Merr., endemic; *R. cumingii* O. Kuntze, endemic; *R. luzoniensis* Merr., endemic; *R. zambalensis* Elm., endemic.; *R. pirifolius* Sm. var. *latifolius* Focke, Java, Sumatra, and Negros; *R. benguetensis* Elm., endemic; *R. mearnsii* Elm., endemic; *R. angulosis* Focke n. sp., Malay Peninsula and Archipelago, "Anscheinend auch auf Luzon;" *R. glomeratus* Bl. var. *pileanus* Focke n. var., Luzon, the species in Java; *R. vidalii* Focke n. sp., endemic; *R. hasskarlii* Miq., subsp. *dendrocharis* Focke, New Guinea, Bismarck Archipelago, Carolines, Fiji, Mindanao; *R. rolfei* Vid., endemic, and *R. elmeri* Focke n. sp., endemic.

Foslie, M. Nye Kalkalger. *Kgl. Vidensk. Selsk. Skrifter* (1908) no. **12**: 1–9.

Litholepis indica Fosl., forma *philippinensis* Fosl., is described from Philippine material.

Gagnepain, F. Essai d'une classification des Cratoxylon asiatiques. *Notul. Syst.* **1** (1909) 14–22.

Eleven species are considered, four of which are reported from the Philippines. Of the Philippine forms, *C. floribundum* (Turcz.) F.-Vill., which I have reduced to *C. celebicum* Bl., is reduced by Gagnepain to *C. clandestinum* Bl., while *C. arborescens* (Vahl) Bl. is reduced to *C. blancoi* Bl., although Vahl's name is much the oldest.

Hennings, P. Fungi Warburgiani. *Hedwigia* **32** (1893) 216–227.

Thirty-one species of fungi are credited to the Philippines in this paper, of which a single one, *Xylaria luzoniensis*, is described as new.

Herter, W. Beiträge zur Kenntnis der Gattung Lycopodium. Studien über die Untergattung Urostachys. *Engl. Bot. Jahrb.* **53** (1909) Beibl. **98**: 1–56.

One hundred and forty species are recognized, of which forty-eight are described as new. No species are credited to the Philippines by definite citation of specimens, but of those considered, the following have been reported from the Archipelago by various authors: *Lycopodium serratum* Thunb., *L. verticillatum* Linn. f., *L. carinatum* Desv., *L. squarrosum* Forst., *L. phyllanthum* Hook. & Arn., *L. phlegmaria* Linn., and *L. pinifolium* Blume.

Herter, W. Ein neuer Beitrag zur Kenntnis der Gattung Lycopodium. *Hedwigia* **49** (1909) 88–92.

Several new species are described, including *Lycopodium magnusianum* Hert., based on material collected by Mrs. Clemens in Mindanao.

Hooker, J. D. A Review of the Known Species of Philippine Islands Species of Impatiens. *Kew Bull.* (1909) 281–289.

Twenty-five species are enumerated, all but two of which are described as new, all being endemic with the exception of the introduced *Impatiens balsamina* Linn. The species are as follows: *Impatiens balsamina* L., and forma *diplocycla* Hk. f., *I. polyactina* Hk. f., *I. burkei* Hk. f., *I. merrillii* Hk. f.,

I. hutchinsonii Hk. f., *I. clemensae* Hk. f., *I. biganensis* Hk. f., *I. caviteana* Hk. f., *I. elmeri* Hk. f., *I. manillensis* Walp., *I. quercetorum* Hk. f., *I. klemmeana* Hk. f., *I. pubisepala* Hk. f., *I. mearnsii* Hk. f., *I. vidalii* Hk. f., *I. barnesii* Hk. f., *I. rizaliana* Hk. f., *I. ahernii* Hk. f., *I. montalbana* Hk. f., *I. ramosii* Hk. f., *I. filicaulis* Hk. f., *I. curranii* Hk. f., *I. cryptogama* Hk. f., *I. cleistogama* Hk. f., and *I. loheri* Hk. f.

Jussieu, A. L. Observations sur la famille des plantes Verbénacées. *Ann. Mus. Paris* **7** (1806) 63–67.

Aegiphila viburnifolia (=*Premna* ?), and *Vitex parviflora* are described from the Philippines.

Kränzlin, F. Zwei neue Orchideen von den Philippinen. *Fedde's Repertorium* **7** (1910) 97, 98.

Cirrhopetalum chryseum Kränzl., and *Trichoglottis solerederi* Kränzl. are described as new.

Kränzlin, F. Einige neue Orchidaceen. *Fedde's Repertorium* **7** (1909) 38–41.

Sarcopodium stella sylvae Loher & Kränzlin is described from Luzon, and *Dendrobium goldschmidtianum* Kränzlin from "Provinz der Philippinen und Formosa."

Kükenthal, G. Cyperaceae-Caricoideae. *Pflanzenreich* **38** (1909) 1–824.

Four genera are recognized, the chief interest centering in *Carex*, of which 798 species are recognized, with numerous subspecies, varieties, and forms. *Uncinia* with 23 species, confined to South and Central America, Mexico, New Zealand, and Australia, with one species extending to New Guinea, is now known to occur in Luzon (*U. rupestris* Raoul var. *capillacea* Kükenthal). Of the genus *Carex*, the following species are definitely recorded from the Archipelago: *Carex rara* Boott, Ceylon, mountains of India, and Borneo; *C. baccans* Nees, India and Ceylon to southern China, Formosa, Java, and Sumatra; *C. filicina* Nees, India and Ceylon, central China, and Java; *C. continua* Clarke, Himalayan region, Burma, and central China; *C. rafflesiana* Boott, var. *scaberrima* (Boeck.) Kükenth., Java, Sumatra, Celebes, Ternate; *C. walkeri* Arn., var. *turrita* (Clarke) Kükenth., the variety endemic, the species in India, Ceylon, and Java; *C. fuirenoides* Gaudich., var. *cirrhulosa* (Nees) Kükenth., the variety endemic, the species in the Marianne Islands; *C. nodiflora* Boeck., endemic; *C. graeffeana* Boeck., Fiji; *C. cryptostachys* Brongn., Malay Peninsula, Waigou, Tonkin, Hongkong, and Formosa, and *C. brunnea* Thunb., India to the Mascarene Islands, Japan, Malaya, New Caledonia, and Australia. *Carex rhynchachaenium* C. B. Clarke is mentioned only as a species unknown to the author, and *C. subtransversa* C. B. Clarke is discussed under *C. brownii* Tuckerm. The above list of thirteen Philippine species has been greatly increased by the more recent collections in the Archipelago.

Moore, S. Le M. Alabastra diversa – Part IV. *Journ. Bot.* **37** (1899) 168–175.

Two Philippine species are described as new, from the collections of John Whitehead, *Eurya amplexicaulis* from Mindoro (more recently described by Mr. Elmer as *E. auriculata*), and *Trichosporum breviflorum* from Negros.

Presl, C. B. Hymenophyllaceae. Eine botanische Abhandlung. (1843) pp. 1–70, *pl. 12.* (Reprint from *Abhandl. Böhm. Ges. Wiss.* V **3**:93–163).

The following species are described from the Philippines, all based on specimens collected by Cuming: *Trichomanes asplenioides, T. dimidiatum, T. saxifragoides, T. palmatum, T. luzonicum, T. acutum, T. millefolium, T. apiifolium, T. eminens, Didymoglossum brevipes, D. undulatum, D. serrulatum, D. longisetum, Hymenophyllum paniculiflorum, Sphaerocionium macrocarpum, Cephalomanes atrovirens* and *Abrodictyum cumingii.*

Radlkofer, L. Über die Gattung Allophylus und die Ordnung ihrer Arten. *Sitz. Math.-Phys. Klasse Kgl. Bayer. Akad. Wissensch.* **38**[2] (1909) 201–240.

One hundred and fifty-six species are recognized, and an analytical key is given to them. Eighteen species are Philippine, of the forty-nine known from the Indo-Malayan-Polynesian region, and fourteen of these are endemic. The Philippine species are as follows: *Allophylus largifolius* sp. nov., *A. unifoliolatus* Radlk., *A. apiocarpus* sp. nov., *A. hymenocalyx* sp. nov., *A. racemosus* Radlk., *A. ternatus* Radlk., *A. setulosus* Radlk., *A. leptococcus* Radlk., *A. dasythyrsus* sp. nov., *A. malvaceus* sp. nov., *A. filiger* Radlk., *A. macrostachys* Radlk., *A. grossedentatus* F.-Vill., *A. chlorocarpus* sp. nov., *A. timorensis* Blume, *A. dimorphus* Radlk., *A. quinatus* Radlk., and *A. insignis* sp. nov.

Radlkofer, L. Ueber die Sapindaceen Holländisch-Indiens. *Act. Congr. Int. Bot. Amsterdam* **1877** (1878) 70–133 (reprint 1–63).

Contains many notes on the synonymy of Philippine species, some new combinations, and the descriptions of several new species from the Archipelago, *Lepisanthes ? eriolepis, Allophylus dimorphus,* and *A. filiger,* the latter two credited to Java, but the specimens on which they were based were really collected in the Philippines (coll. Lobb) and distributed with erroneous localizations.

Radlkofer, L. Natchträge zur Uebersicht der Sapindaceen Hollandisch-Indiens (issued with the reprint of the above, pp. 65–103).

Supplementary to the preceding paper, and containing some additional notes on Philippine species.

Radlkofer, L. Ueber eine von Grisebach unter den Sapotaceen aufgeführte Daphnoidee. *Sitz. Math.-Phys. Klasse Kgl. Bayer. Acad. Wissench.* **14** (1884) 487–250.

In a consideration of the genus *Parameria, P. philippinensis* and *P. vulneraria* are described from the Philippines.

Rehm, H. Ascomycetes novi. *Ann. Mycol.* **5** (1907) 516–545.

A single Philippine species is described as new, *Mollisia copelandi* Rehm, from Mindanao, on leaves of *Caryota.*

Richard, A. Mémoire sur la famille des Rubiacées, contenant la description générale de cette famille et les caractères des genres qui la composent. (July, 1829) 1–226, *pl. 14. Mém. Soc. Hist. Nat. Paris* **5** (1834) 81–304, *pl. 11–29.*

Mussaenda philippica, Sabicea perrottetii, Plectronia monstrosa and *Canthium lycioides* are described from Philippine material, all of which have been overlooked by most recent Philippine authors. According to the date on the title page the separate was issued about five years before it appeared in the "Mémoires."

Ridley, H. N. New Philippine Zingiberaceae. *Leafl. Philip. Bot.* **2** (1909) 569–572. (Article 28.)

A new genus *Elmeria* is described (non *Elmera* Rydb.), with two species, *E. bifida* (*Hornstedtia paradoxa* Ridl.), and *E. pinetorum.* Three species in other genera are also described, *Phrynium philippinense* Ridl., *Alpinia penduliflora,* and *Plagiostachys philippinensis.*

Ridley, H. N. Zingiberaceae from South Negros. *Leafl. Philip. Bot.* **2** (1909) 603–607. (Article 31.)

Sixteen species are enumerated, the following described as new: *Alpinia musaefolia, Amomum lepicarpum* and var. *pubescens, Hornstedtia conoidea, H. microcheila,* and *H. lophophora,* while the new generic name *Adelmeria* is proposed for *Elmeria* Ridl., non *Elmera* Rydb. See Ridley "The Scitamineae of the Philippine Islands" *Philip. Journ. Sci.* **4** (1909) Bot. 155–199.

Rolfe, R. A. Supplementary List of Philippine Plants. *Journ. Bot.* **23** (1885) 209–216.

A list of 186 Philippine species which were not included by F.-Villar and Naves in the "Novissima Appendix" to the third edition of Blanco's "Flora de Filipinas." The paper contains the following new combinations: *Strombosia philippinensis* (Baill.) Rolfe, *Gomphandra laxiflora* (Miers) Rolfe, *Cupania revoluta* (Turcz.) Rolfe, *C. subundulata* (Turcz.) Rolfe, *Connarus trifoliatus* (Presl) Rolfe as "*trifoliolatus*," *Terminalia mollis* (Presl) Rolfe, *Barringtonia luzonensis* (Miers) Rolfe, *Crypteronia leptostachys* (Planch.) Rolfe, *Urophyllum memecyloides* (Presl) Rolfe, *Micrechites schrieckii* (Huerck & Muell. Arg.) Rolfe, and *Symplocos oblongifolia* (Presl) Rolfe.

Stephani, F. Hepaticarum species novae III. *Hedwigia* **32** (1893) 204–214.

Bazzania latifolia is described as new from the Philippines, the type from Siargao Island.

Stephani, F. Three New Liverworts. *Leafl. Philip. Bot.* **2** (1908) 385, 386. (Article 18.)

Anthoceros elmeri, Plagiochila elmeri, and *Trichocolea striolata* are described as new from material collected in Luzon.

Sydow, H. et P. Fungi novi Philippinenses. *Ann. Mycol.* **8** (1910) 36–41.

Twenty-two new species of Philippine fungi are described, as follows: *Puccinia mesomorpha, Uredo manilensis, Meliola hyptidis, Valsella pinangae, Rosellinia procera, Nummularia gracilenta, Hypoxylon minutellum, H. lilliputianum, Xylaria gracilenta, Phyllachora aggregatula, P. circinata, P. lepida, Homostegia fusispora, Hypocrella botryosa, Seynesia scutellum, Lembosia congregata, Mollisia ravida, Bulgaria pusilla, Cytospora calami, C. lirella, Melasmia exigua,* and *Septogloeum aureum.*

Trécul, A. Mémoire sur la famille des Artocarpées. *Ann. Sci. Nat. Bot.* III **8** (1847) 38–157, *pls. 1–6.*

In this work the following Philippine species are described for the first time: *Conocephalus acuminatus* Tréc., *C. microphyllus* Tréc., *Artocarpus cumingiana* Tréc., *A. nitida* Tréc., *A. lanceolata* Tréc., *Cudrania obovata* Tréc. The several species previously described by Blanco are not considered.

Virgil, R. M. Diccionario de los nombres vulgares que se dan en Filipinas á muchas plantas usuales y notables del mismo archipiélago, con la correspondencia científica, la clasificación natural, y la indicación de su uso. (1879) VI+50.

The scientific names in many cases are inaccurate and not to be trusted.

Zahlbruckner, A. Lichenes philippinenses. *Leafl. Philip. Bot.* **2** (1908) 435–438. (Article 21.)

Twenty-two species are enumerated including *Sticta elmeri* which is described as new; for a corrected diagnosis of this species see Zahlbruckner, "Neue Flechten – V." *Ann. Mycol.* **7** (1909) 472–478.

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THE BAMBOOS OF THE PHILIPPINE ISLANDS.

By J. SYKES GAMBLE.

(East Liss, Hants, England.)

By the kindness of Mr. E. D. Merrill I have had the privilege of examining and reporting on a most valuable collection of Philippine *Bambuseae* belonging to the Herbarium of the Bureau of Science, and below is given the results of my endeavors to name the specimens. I regret that I have failed to identify with any approach to certainty most of the species named by Blanco. In the material quoted I have included the majority of the Philippine specimens in the Herbarium of the Royal Gardens at Kew.

1. ARUNDINARIA Michx.

1. Arundinaria niitakayamensis Hayata in Bot. Mag. Tokyo **21** (1907) 49, Journ. Coll. Sci. Tokyo **25** [19] (1908) 240.

Bambusa sp. near *B. pygmaea* Miq.; Merrill in Philip. Journ. Sci. **2** (1907) Bot. 261.

LUZON, Province of Benguet, Pauai, in sphagnum hummocks and mossy grass lands, altitude about 2,150 m, *Merrill 4733*, November, 1905, *Bur. Sci. 8379 McGregor*, June, 1909; Mount Ugo, *Bur. Sci. 5846 Ramos*, December, 1908; Mount Pulog, on grass-covered slopes and along the upper border of the mossy forest, altitude about 2,600 m, *Merrill 6489*, May, 1909, *Bur. Sci. 8893 McGregor* (*Phil. Pl. 177*), July, 1909; Payaon and Mangito, *Loher 1834* (Herb. Kew.). MINDORO, Mount Halcon, *Merrill 6222*, November, 1906, in sphagnum in dense thickets at 2,600 m altitude. FORMOSA, Mount Morrison, Gauzan, *Nagasawa 678*, altitude 2,770 m, 1905.

At first I thought that this must be a new species, but Mr. Merrill, who had seen the type of Doctor Hayata's species in the Tokyo Herbarium, called my

attention to *Arundinaria niitakayamensis*, suggesting that the Philippine plant is identical with the Formosan one. On making application to Doctor Hayata, he most kindly sent me a specimen of his species with both leaves and flowers, an examination of which proved Mr. Merrill's suggestion to be correct. There are slight differences in the flowers, it is true, such as the smaller, not so long-awned, outer empty glumes, but in other respects the specimens agree, and Doctor Hayata also, writing to Mr. Merrill, expressed himself of the same opinion.

The culms appear most generally to reach a height of 1 m or less, sometimes in more sheltered places 2.5 m, the diameter near the base 1 cm or less. The internodes are about 10 cm long and the culm-sheaths are rather longer, striate and hispid on the back, acuminate at the tip, and with a short-acuminate pseudophyll. The branches have quite short internodes, persistent chaffy sheaths, and small, much crowded leaves; as in the Formosan plant, the cross-bars of the leaf-nerves are about 5 per millimeter. The flower-panicles are terminal, and few-flowered, the spikelets are about 2 cm in length (shorter than in the Formosan plant where they reach 3 cm in the material available), and there are usually about six flowers to each spikelet. The caryopsis is unknown.

As originally suggested by Mr. Merrill, following Doctor Hackel, this species resembles the Japanese *Arundinaria pygmaea* Kurz (*Bambusa pygmaea* Miq.), but differs in its narrower leaves; it also comes near to *A. densifolia* Munro, of the mountains of southern India and Ceylon, but that species has spikelets with only one flower.

2. **BAMBUSA** Schreb.

Culms unarmed.
- Small shrubby species 2 to 3 m high ..... 1. *B. nana*
- Coarse arborescent species.
  - Leaf-sheaths with rounded auricles ..... 2. *B. vulgaris*
  - Leaf-sheaths with horn-like, erect processes.
    - Leaves large; spikelets glabrous; keels of the palea not prominently ciliate. 3. *B. cornuta*
    - Leaves small; spikelets densely hirsute; keels of the palea prominently ciliate ..... 4. *B. Merrillii*

Culms spiny ..... 5. *B. Blumeana*

1. **Bambusa nana** Roxb. Hort. Beng. (1814) 25, nomen, Fl. Ind. ed. Carey **2** (1832) 199; Munro in Trans. Linn. Soc. **26** (1868) 98; Gamble in Ann. Bot. Gard. Calc. **7** (1896) 40, *pl. 38*, et in Hook. f. Fl. Brit. Ind. **7** (1898) 390.

LUZON, Manila, *Merrill 7049*, sterile; cultivated as a hedge plant, a native of China and Japan.

2. **Bambusa vulgaris** Schrad. in Wendl. Collect. Pl. **2** (1810) 26, *t. 47;* Munro in Trans. Linn. Soc. **26** (1868) 106; Gamble in Ann. Bot. Gard. Calc. **7** (1896) 43, *t. 40*, et in Hook. f. Fl. Brit. **7** (1907) 391.

LUZON, Province of Camarines, San Jose de Lagonoy, *Peruera*, December, 1909: Province of Isabela, Carig, *Vidal 4023*, March, 1886 (in Herb. Kew.): Province of Bataan, Lamao River, *Whitford*, September, 1905. PALAWAN (Paragua), Separation Point, *Merrill 802*, February, 1903.

Native country so far unknown; cultivated and often half-wild in India, Burma, Ceylon, Malaya, Mauritius, Cape of Good Hope, West Indies, Central and South America, etc.

Whitford gives the vernacular name as *cauayan quiling*, the same being given by Blanco for his *Bambusa monogyna*.

Var. **striata** Gamble in Ann. Bot. Gard. Calc. **7** (1896) 44.

LUZON, Manila, *Merrill 7050,* sterile; cultivated for ornamental purposes, introduced from India or Malaya.

I have never received flowering specimens of the variety *striata,* but the ordinary *Bambusa vulgaris* is frequently found in flower.

3. **Bambusa cornuta** Munro in Trans. Linn. Soc. **26** (1868) 113.

Bambusa corniculata Kurz in Ind. Forester 1 (1876) 341, non Munro.

A straggling bamboo reaching a height of 7 to 8 m, the branches dilated and patellate at the nodes, reaching 1 cm in diameter. Leaves ovate-lanceolate, broadest and unequal at the base, rounded or more or less cuneate, apex long-acuminate, the acumen scabrid beneath, 30 to 35 cm long, 5 to 9 cm broad, the texture soft, thin; nerves 9 to 13 pairs; petiole very short, flat; sheaths striate, glabrous, truncate at the mouth and furnished on one or both sides with a stiff, straight, horn-like appendix about 7 mm in length, with a few, long, stiff bristles; ligule short, truncate. Flowers apparently on separate flowering culms in very long, soft, branching panicles with many bracts, those on the upper branches scattered, those on the lower ones in heads. Spikelets oblong, acuminate, 5- or 6-flowered, the rachillas between the flowers glabrous, sinuate, 1 to 2 mm long; empty glumes 2, glabrous, acuminate, 3 to 5 mm long; flowering glumes 6 to 7 mm long, mucronate, scabrous on the back; paleas as long as the fertile glumes, mucronate, tufted at the tip, stiffly villous between the keels; lodicules ovate-acuminate, not fringed. Stamens 6, free, linear, 2 to 3 mm long. Ovary cylindric. Stigmas 3, plumose. Fruit not known.

LUZON, Province of Nueva Vizcaya, Quiangan, *Merrill 124!,* June 6, 1902. Known also from Java, *Horsfield 193, Koorders 23693 β!,* Bedalia Lake, Lamadjong, *Zollinger 4904!*

I have felt a slight doubt about the identification of Mr. Merrill's plant because the spikelets are not in rounded heads as they are in Koorders' specimens. Zollinger's specimens, however, show that lower verticils have the spikelets in heads while the upper ones have them scattered, so I conclude that the difference is merely one of position. The leaves of all the specimens agree excellently. I can not agree with Kurz in thinking *B. Horsfieldii* Munro, l. c. 115, to be the same as *B. cornuta,* after reading carefully the descriptions of the leaves.

4. **Bambusa Merrillii** Gamble sp. nov.

Frutex arborescens, vagans. Culmi vagantes ad 18 m longi; ramuli ad nodos culmi fasciculati, geniculati, infra nodos annulos patelliformes ferentes. Folia lineari-lanceolata, apice in acumen setaceo-acuminatum infra scabro-hispidum attenuata, basi subinaequaliter attenuata vel rotundata, 8 ad 10 cm longa, 12 ad 15 mm lata; vaginae striatae, glabrae, ad unum marginem insigniter ciliatae, ad apicem latere uno vel utroque appendice corniformi erecto vel curvato sparse sed longe fimbriato instructae; ligula brevis truncata; petiolus brevissimus complanatus. Flores in ramulis foliiferis, in capitulis congestis bracteatis 2 cm diametro aggregati; patella annularis sub nodis reflexa. Spiculae lanceolatae, 2.5 ad 3 cm longae, dense hirsutae, flores 2 fertiles et ultimum sterilem ferentes; glumae steriles 2, mucronatae, dorso scabro-hirsutae, nervis conspicuis, 7 ad 8 mm longae; glumae fertiles sterilibus similes, 10 mm longae; paleae latissime bicarinatae, intra carinas trinervae et nervulis

transversalibus, ad carinas longe ciliatae, apice mucronatae; lodiculae 3, hyalinae, 2 laterales 4 mm longae, ovatae, subfalcatae ad basin incrassatae margine ciliatae, media paleae adnata minor, 3 mm·longa, oblonga, glabra. Stamina 6, libera, linearia, apice obtusa, 6 mm longa. Ovarium angustum, stigmatibus longe plumosis. Fructus ignotus.

LUZON, Province of Nueva Vizcaya, Caraballo Mountains, *Merrill 229*, May, 28, 1902, in forests, altitude about 600 m.

This species apparently comes near to *Bambusa Horsfieldii* Munro, of Java, but does not quite agree with the description of that plant.

5. **Bambusa Blumeana** Schultes f. Syst. Veg. 7[2] (1830) 1343; Kunth Enum. 431; Munro in Trans. Linn. Soc. **26**:101; Kurz in Ind. Forester **1**:340; Lindl. in Penny Cycl. **3**:356; Gamble in Ann. Bot. Gard. Calcutta **7** (1896) 43, *t. 47*, et in Hook. f. Fl. Brit. Ind. **7** (1897) 394.

Bambusa spinosa Blume ex Nees in Bot. Zeit. **8** (1825) 580.

Ischurochloa spinosa Büse in Miq. Pl. Jungh. (1854) 389.

Schizostachyum Durie Rupr. in Mém. Acad. Pétersb. VII **5** (1839) 136.

Bambusa Teba Miq. Fl. Ind. Bat. **3** (1857) 418, fide Kurz in Ind. Forester **1**:336.

LUZON, Province of Bulacan, Malolos, *Yoder*, 1906; Baliuag, *Phil. Pl. 190 Merrill, Bur. Sci. 9645 Robinson*, January, 1910, local name *cauayan* or *cauayan totoo:* Province of Bataan, Lamao River, *Whitford*, September, 1905, local name *cauayan totoo:* Province of Rizal, Bosoboso, *Loher 1833*, March, 1893 (Herb. Kew.); Pasay, near Manila, *Merrill*, May, 1909. PANAY, Province of Iloilo, Igbaras, *Vidal 4022*, March, 1886 (Herb. Kew.). MINDANAO, District of Davao, Todaya, *Elmer 10757*, May, 1909.

Malay Peninsula and Archipelago.

3. GIGANTOCHLOA Kurz.

1. **Gigantochloa Scribneriana** Merrill in Philip. Journ. Sci. **1** (1906) Suppl. 390.

CUYO, *F. Lamson-Scribner 14*, December, 1902. LUZON, Province of Bulacan, Baliuag, *Merrill, Bur. Sci. 9642 Robinson*, January, 1910. PANAY, Capiz, *For. Bur. 10834 Apostol.*

I believe that I am right in identifying the three last-mentioned specimens with this species, though the imperfection of the type specimen makes me still feel not quite sure. The flowers agree well with the description, but the leaves differ a little; however, it has to be remembered that in these large bamboos, the leaves differ very greatly in size and shape, even in the same clump, according to the part of the culm from which they are taken.

I have also received the specimen, quoted below, which I am unable to identify with certainty, but I believe it to be the common Malay species, *Gigantochloa Atter* Kurz ex Munro in Trans. Linn. Soc. **26** (1868) 125.

POLILLO, *Bur. Sci. 10414 McGregor*, October, 1909.

4. DENDROCALAMUS Nees.

Spikelets large; leaves large	1. *D. latiflorus*
Spikelets medium-sized; leaves long	2. *D. Curranii*
Spikelets very small	3. *D. paviflorus*

1. **Dendrocalamus latiflorus** Munro in Trans. Linn. Soc. **26** (1868) 152, *t. 6;* Gamble in Ann. Bot. Gard. Calc. **7** (1896) 131, *t. 117*, et in Hook. f. Fl. Brit. Ind. **7** (1897) 407.

Bambusa latiflora Kurz in Journ. As. Soc. Beng. **42**[2] (1873) 250.

Bambusa verticillata Benth. Fl. Hongk. (1861) 434, fide Munro.

Bambusa Beecheyana Munro l. c. 108 (?).

Luzon, Province of Camarines, San Jose de Lagonoy, *Bur. Sci. 6313 Robinson,* August 25, 1908.

Though not quite sure, I believe that I am correct in the identification of this specimen. The only differences of any consequence seem to be that the spikelets are rather more hairy and the leaves narrower than in the type. Doctor Robinson gives the vernacular name *boton.* It is said to be called *bolongsina* elsewhere in the same province.

2. **Dendrocalamus Curranii** Gamble sp. nov.

Frutex. Culmus erectus ad 7 m altus, 6 cm diametro; parietes 12 mm crassi; ramuli foliiferi et floriferi distincti, foliiferi ad nodos fasciculati et basi vaginis persistentibus, dorso aureo-fulvis, brevissime apiculatis, ore fimbriatis et ligulam setis multis curvatis ferentibus muniti; ramuli floriferi duri ad nodos incrassati, internodiis teretibus nitidis. Folia lineari-lanceolata, acuminata, ad 30 cm longa et 6 cm lata, basi rotundata, marginibus tactu scabris, nervo medio nitido haud prominente, lateralibus utrinque circiter 10–12, supra opaca, glabra, infra sparsim sericeo-villosa; petiolus perbrevis complanatus; vaginae striatae, scabrae, sericeo-villosae, ore truncatae, et ciliis paucis interdum munitae, ligula brevi puberula. Panicula maxima, ramis permultis, ramulis longissimis, curvatis, alternatim glomerulis spicularum squamatis munitis; internodia gradatim minora, 4–1 cm longa, uno latere sulcata, tomentosa, altero glabra; glomerulae parvae, 7 ad 10 mm latae, spiculis paucis fertilibus, aliis imperfectis interjectis. Spiculae ovatae, acuminatae, 10 ad 15 mm longae, extus villosae; glumae steriles 2, late ovatae, ciliatae, villosae; flores fertiles 4, addito quinto terminali imperfecto; glumae fertiles ovatae ad ovato-oblongae, mucronatae, marginibus ciliatae, 8 ad 10 mm longae; paleae oblongae, minute bimucronatae, bicarinatae, carinis ciliatis, glumis fertilibus aequilongae. Stamina linearia, 1 mm longa, apiculata, apice scabro. Ovarium late ovatum, dense villosum, in stylum longum, tenue villosum attenuatum; stigmatibus 1 vel 2, plumosis. Fructus non visus.

Luzon, Province of Tayabas, Sampaloc, *For. Bur. 10177 Curran,* March, 1908. Polillo, *Bur. Sci. 10417 McGregor,* October-November, 1909 (probably).

This must be a fine bamboo. It seems to come near to *Dendrocalamus giganteus* Munro, but the spikelets are much smaller and much more hairy. It is a pity that good culm-sheaths have not been collected. Curran gives the vernacular name as *cauayan sina.* The Polillo specimen is rather meager, but I believe it belongs to this species.

3. **Dendrocalamus parviflorus** Hack. in Philip. Journ. Sci. 3 (1908) Bot. 168.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens*, March, 1907. LEYTE, Palo, *Elmer 7283*, January, 1906. CEBU, Cogon, *Barrow*, June, 1904.

This seems to be a good species. The Leyte plant has apparently been described as *Gigantochloa Merrilliana* Elmer, but I find no difference between it and the specimens of *Dendrocalamus parviflorus* Hack. Barrow gives the vernacular name *cauayan*.

5. CEPHALOSTACHYUM Munro.

1. **Cephalostachyum mindorense** Gamble sp. nov.

Culmus fruticosus, subscandens, fistulosus, ad 3 cm diametro; internodia longa, nitida, teretia; nodi incrassati. Folia membranacea, supra glabra, infra glabra vel minute pubescentia, lanceolata vel lineari-lanceolata, apice longe acuminata, basi attenuata vel rotundata, 15 ad 25 cm longa, 3 ad 5 cm lata; nervi utrinque 7 vel 9, haud conspicui; petiolus 3 ad 6 mm longus; vaginae glabrae, striatae, apice uno vel utroque latere longiuscule cornutae, ligulis longiusculis, longe setaceo-fimbriatis. Flores in culmis foliiferis, in paniculis longis axillaribus vel terminalibus, capitula densiflora ad nodos ramulorum alternatim ferentibus, rachis teres gracilis, internodiis ad 10–15 cm longis, infra nodos saepe annulatis. Capitulae stramineo-coloratae, 1 ad 2 cm latae, spiculis multis, bracteis glumiformibus aristatis multis intermixtis. Spiculae ovato-lanceolatae, aristatae, 1 cm longae, flore unico fertili, 2 imperfectis superne additis; glumae steriles 2, I 5 mm longa, angusta, dorso hispida, apice aristata, II 7 mm longa, late ovato-lanceolata, longe aristata, 9-nervata, marginibus et dorso pilis setaceis longis ciliatae; gluma III fertilis, vacuis similis sed nervis pluribus, 7 ad 8 mm longa; palea ovato-lanceolata, prominenter bicarinata et bimucronata, carinis longe ciliatis, glumae III aequilonga; flores imperfecti oblongo-lanceolati, aristati. Stamina linearia, libera, 3 mm longa, apice bidentata. Lodiculae 2 vel 3, minimae, longe ciliatae. Ovarium oblongum, stylo brevi, stigmatibus? Caryopsis ovatus, 3 mm longus, glaber, apice rostratus, rostro acuto, scabro, 1 mm longo; pericarpium crassum.

LUZON, Province of Camarines, *For. Bur. 10667 Curran*, June, 1908, near the seashore. MINDORO, *For. Bur. 11421 Merritt*, April, 1908, river flats, edge of forests; *For. Bur. 6213 Merritt*, January, 1907; Mount Cabiguayan, *For. Bur. 8619 Merritt*, January, 1908, on the summit and on wooded slopes, altitude about 800 m.

I have been rather puzzled about the genus of this beautiful species, but I believe I am correct in considering it to be a *Cephalostachyum*, very similar to the Burmese *C. pergracile* Munro, and *C. flavescens* Kurz. The only important difference is that instead of a terminal slender rachilla with only a very small rudiment of glumes, this species has two terminal imperfect flowers. It required long search among the spikelets of the specimens available to find one in flower showing perfect stamens, and another in nearly ripe fruit. Merritt gives the vernacular name *bacto*.

6. SCHIZOSTACHYUM Nees.

Flowers in long panicles, usually from flower-bearing culms, or axillary on leafy ones.
  Spikelets sharply pointed, usually in rounded capitula; no lodicules.
    Spikelets glabrous outside.
      Spikelets short, under 1 cm long.
        Leaves usually broad, rounded at the base, mouth of leaf-sheaths and ligules long-bristly-ciliate ..... 1. *S. acutiflorum*
        Leaves usually narrow, attenuate at the base, mouth of leaf-sheaths and ligules not or only slightly bristly.
          Spikelets very sharply pointed; apiculus of anthers shortly hirsute. 2. *S. Dielsianum*
          Spikelets acute only; apiculus of anthers very long-bristly. 3. *S. palawanense*
      Spikelets long, more than 1 cm in length, very slender; anthers obtuse. 4. *S. Hallieri*
    Spikelets more or less pubescent outside; anthers obtuse.
      Spikelets densely white-hairy both on the empty and on the flowering glumes; leaves 1 cm broad..... 5. *S. hirtiflorum*
      Spikelets shortly white-hairy only on the flowering glume; leaves over 1.5 cm broad ..... 6. *S. mucronatum*
  Spikelets hardly sharply pointed, obtuse or acute, usually in long panicles; lodicules usually present.
    Spikelets in rounded capitula, separate or continuous, soft.... 7. *S. Toppingii*
    Spikelets in panicles of racemes, stiff, vaginate.
      Sheaths lanceolate, not aristate; spikelets nearly or quite glabrous, the anther-tips long-plumose ..... 8. *S. Curranii*
      Sheaths ovate-lanceolate, aristate, ciliate; spikelets conspicuously white-ciliate on the margins of the glumes; anthers obtuse.... 9. *S. luzonicum*
Flowers in short, terminal spikes up to 10 cm long; leaves very narrow. 10. *S. Merrillii*

1. **Schizostachyum acutiflorum** Munro in Trans. Linn. Soc. **26** (1868) 137; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 391.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4031 Fénix*, June, 1907. LUZON, Province of Laguna, Calauan, *Cuming 544*, 1836; Cavinti, *Bur. Sci. 10809 McGregor*, December, 1909: Province of Benguet, *Loher 1664, 1666, 1668* (Herb. Kew.): Province of Bataan, *For. Bur. 20049 Topacio, For. Bur. 1261, 2731 Borden, Merrill 1474, 1477, 1528, 2550, 3297, Williams 384, 600, Whitford 75, 519, Bur. Sci. 1641 Foxworthy:* Province of Zambales, *For. Bur. 5880 Curran:* Province of Bulacan, *Yoder:* Province of Tarlac, *Vidal 1964* (Herb. Kew.): Province of Tayabas, *Vidal 928* (Herb. Kew.): Province of Camarines, *Vidal 929, 4021* (Herb. Kew.), *For. Bur. 10413 Curran.* MINDORO, Bongabong River, *For. Bur. 3740, 8711, 8773, 11460 Merritt.* MINDANAO, District of Zamboanga, *Hallier* (?).

As suggested by Doctor Hackel in a manuscript note attached to *Schizostachyum Dielsianum* (*Merrill 711*), this species and *S. Dielsianum* are not easy to separate, but I have attempted to arrange the material sent me and found that in general my identifications agree with Mr. Merrill's at page 391 of his paper on the Philippine grasses. I am inclined to think his suggestion that the *Bambusa Lumampao* Blanco is this species is most probably correct. *S. Dielsianum* has the glomerules of spikelets usually open and scattered and a different texture of leaf. The vernacular name is usually given as *bical;* Topacio gives it as *guimac.*

2. **Schizostachyum Dielsianum** (Pilger) Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 391.

Dinochloa Dielsiana Pilger in Perk. Frag. Fl. Philip. (1904) 148.

Luzon, Province of Benguet, Tabio trail, *Bur. Sci. 8976 McGregor*, July, 1909; Mount Santo Tomas, *Elmer 6566*, June, 1904; *Loher 1660, 1662, 1663* (Herb. Kew.): Province of Pampanga, Arayat, *Merrill 1408*, March, 1903: Province of Zambales, *For. Bur. 388 Maule*, March, 1904: Province of Bataan, *Leiberg 6092:* Province of Laguna, Mount Maquiling, *For. Bur. 13651 Rosenbluth & Tamesis:* Province of Nueva Vizcaya, *For. Bur. 10879, 10888 Curran.* Mindoro, Balete, Baco River, *McGregor 279*, May, 1905. Palawan, *Merrill 711*, February, 1903, *For. Bur. 3548 Curran*, January, 1906.

This bamboo is said by Merrill to be "clambering, 60 to 80 feet high, 1 inch in diameter." Maule calls it *bical boboy.* In regard to the question of the identification of it with *Bambusa diffusa* Blanco, Hackel, in the note referred to above, remarks that the leaf-description does not well agree and that comparison of the fruit is necessary. Blanco describes the leaves of *Bambusa diffusa* as "figura de espada, pelosas por debajo," and the fruit as "grande como un garbanzo, globosa, cubierta con una membrana señalada con cuatro líneas." The latter character seems likely to be important.

3. **Schizostachyum palawanense** Gamble sp. nov.

Culmus suffruticosus, prope basin solidus, 8 mm diametro; internodia ad 20 cm longa, teretia; ramuli fistulosi, ad nodos incrassati. Folia membranacea, glabra, lineari-lanceolata, apice acuminata, basi plus minus inaequaliter acuta, marginibus scabra, 8 ad 15 cm longa, 7 ad 15 mm lata; nervi obscuri, utrinque 4 ad 6; petioli brevissimi, vix 1 ad 2 mm longi; vaginae striatae, ore oblique truncatae et ciliis longis 2 vel 3 munitae; ligulis brevibus parce ciliatis. Flores in paniculis gracilibus, axillaribus in ramulis foliiferis; rachis tenuissimus glomerulis parvis paucifloris ad nodos vaginatis, ultimis saepe continuis; vaginae stramineae, acuminatae, cito caducae. Spiculae in glomerulis plerumque 3 vel 4 fertiles glabrae, 6 ad 7 mm longae, additis aliis imperfectis et bracteis parvis glumaceis; glumae steriles 2 vel 3, ovatae, breviter mucronatae, inferiores I et II 2 ad 3 mm, III 4 mm longae, nervis obscuris; florens 5 mm longa, multum convoluta; palea etiam convoluta, aequilonga. Stamina 6, linearia, libera, 4 mm longa, apiculo 0.5 mm longo pilis albis longis aristatis tecto. Ovarium glabrum, stylo attenuato, longo, nitido, stigmatibus 3, longis, plumosis. Fructus ignotus.

Palawan, Puerto Princesa, *Bur. Sci. 277 Bermejos*, January, 1906.

The specimen bears flowering shoots not only in the axils of the branchlets, but also direct from the roots, but this may not always be the case. As noted by Hackel, it seems an anomalous species, with spikelets not unlike those of *S. acutiflorum*, but with the apiculus of the stamens quite different.

4. **Schizostachyum Hallieri** Gamble sp. nov.

Frutex dense caespitosus; culmus 8 ad 9 m altus, 2 ad 4 cm diametro; internodia ramulorum gracilia longissima, saepe 1 ad 1.2 m attingentia. Folia membranacea, lanceolata vel ovato-lanceolata, apice setaceo-acuminata, acumine scabro, basi inaequaliter rotundata, marginibus scabra

et saepe hyalina, supra glabra, infra puberula, 15 ad 30 cm longa, 3 ad 7 cm lata; costa pallida, supra impressa, infra prominens nitida, nervi utrinque 8 vel 9, supra obscuri; petioli 5 ad 10 mm longi, complanati; vaginae glabrae, striatae, ore truncatae et utrinque ciliis (ad 12) longis (ad 6 mm) munitae, ligulis etiam conspicue longe ciliatis. Flores in paniculis longis ramulosis e culmi nodis, ramulis foliiferis admixtis; panicularum ramuli ad nodos glomerulos 1 ad 1.5 cm diam. ferentes, glomeruli supremi aliquando subcontinui, rachis ramulorum gracilis, subfiliformis, minute puberulus; glomeruli spiculas multas fertiles ferentes, additis paucis imperfectis et bracteis multis stramineis. Spiculae lineari-lanceolatae, angustae, 15 mm longae, glabrae, basi ad rachim vagina ovata 8 mm longa suffultae, deinde bractea parva, 2.5 mm longa, bicarinata, ciliata; glumae steriles 4, I 3 mm, II 6 mm, III 7 mm, IV 10 mm, omnes 7–9-nervae et breviter mucronate; fertilis 15 mm longus, convolutus, mucronatus; palea paullo brevior, etiam convoluta, hyalina. Stamina 6, imprimis filamentis conjunctis sed cito separandis; antherae lineares, 6 ad 7 mm longae, obtusae. Ovarium tenue, stylo crustaceo nitido longo et stigmatibus 3 brevibus plumosis. Fructus ignotus.

BASILAN, *Hallier*, January, 1904. MINDORO, Subaan, *For. Bur. 11374 Merritt*, April, May, 1908. LEYTE, Palo, *Elmer 7145*, January, 1906. LUZON, Province of Bataan, Lamao River, *Whitford*, September, 1905. MINDANAO, District of Zamboanga, *Copeland s. n.*, May, 1910.

This bamboo is said by Merritt and by Whitford to be called *anos*, the native name given by Blanco for his *Bambusa lima*. Mr. Merrill thinks that it is *Bambusa lima* Blanco, but the description of that plant, whatever it was, is not one which is likely to ensure identification and *anos* leaves can scarcely be called "angusta."

5. **Schizostachyum hirtiflorum** Hack. in Philip. Journ. Sci. **2** (1907) Bot. 420.

Schizostachyum sp. Merrill l. c. **1** (1906) Suppl. 391.

LUZON, Province of Benguet, *Loher 1659* (Herb. Kew.); Sablan, *Elmer 6173*, April, 1904: Province of Cagayan, Tuguegarao, *Williamson*, February, 1906: Province of Ilocos Norte, *Bur. Sci. 2240, 2310 Mearns*, January, 1907: Province of Pangasinan, *For. Bur. 8334 Curran & Merritt*, December, 1907, with diseased inflorescence: Province of Bataan, *For. Bur. 17311 Curran*, June, 1909 (?): Province of Rizal, *Loher 1658, 1667;* Morong, *Bur. Sci. 1419 Ramos*, August, 1906.

Mr. Elmer describes this species as erect, 20 to 30 feet high, 3 to 5 inches in diameter, growing in dry ravines. Curran & Merritt call it *bical* and say that it is "common on ridges and slopes, forming dense thickets." Ramos' specimen bears the Tagalog name *boo* and has been doubtfully identified with *Bambusa levis* Blanco, but the leaves have not the under surface "molliter lanata," and so I fear the identification can not be accepted. I am inclined to refer to this species Merrill's no. 581, collected on Culion Island in December, 1902, which he says is called in Tagalog *bagacan*, and describes as reaching 30 to 40 feet in height and forming extensive dense thickets. Loher gives the native name *bocaui*. Curran's no. 17311 is a rather imperfect specimen with terminal short inflorescence, but I believe it to belong to this species.

6. **Schizostachyum mucronatum** Hack. in Philip. Journ. Sci. **3** (1908) Bot. 169.

LUZON, Province of Ilocos Sur, Dolores, *For. Bur. 5659 Klemme*, October, 1906: Province of Pangasinan, *For. Bur. 8275 Curran & Merritt*, December, 1907: Province of Camarines, *For. Bur. 10414 Curran*, May, 1908: Province of Bataan, *For. Bur. 3615 Maule*, January, 1906. MINDANAO, District of Davao, Todaya, *Elmer 10838*.

Klemme says that this bamboo is called *bolo* and grows in open forests on steep rocky slopes, being "too common;" Curran gives the name *boho* or *caña boho;* Maule gives the name as *bojo*, and his specimen has been identified with *Bambusa lumampao* Blanco, which may prove to be correct, at any rate there seems to be nothing special in Blanco's description to prevent it. But the description might fit several other species just as well and the only definite thing about it is that *B. lumampao* is the bamboo from which sticks are made and commonly sold in Manila. Only local investigation can properly utilize this information.

7. **Schizostachyum Toppingii** Gamble sp. nov.

Frutex erectus vel scandens; culmi parce fistulosi, teretes, nitidi; internodiis brevibus; ramuli duri, nitidi, foliiferi et floriferi eodem culmo, nodis incrassati. Folia subcoriacea, glabra, praecipue ad extremitates ramulorum aggregata, vaginis multis veteribus suffulta, linearilanceolata, apice longe setaceo-acuminata, basi rotundata vel cordata, interdum attenuata; marginibus scabra et saepe cartilaginea, 12 ad 30 cm longa, 1.5 ad 3 cm lata; nervi utrinque circiter 6; petioli breves, 1 ad 2 cm longi, crassi; vaginae durae, striatae, ore truncatae et ciliis paucis ornatae, ligulis brevissimis. Flores in spicis longissimis glomerulorum paniculatim ramulosis; glomeruli alternati, saepissime subglobosi, 1 ad 1.5 cm diametro, interdum dense aggregati praecipue versus apices ramulorum; rachis teres, uno latere sulcatus, infra nodos puberulus. Spiculae glabrae, in glomerulis densissime aggregatae, fertiles longiores, imperfectis multis admixtis, 5 ad 8 mm longae, vix acutae; glumae steriles 2 vel 3, ovatae, I 2 mm, II 3 mm, III 4 mm, omnes 7- ad 9-nerves, minute mucronatae; fertiles 5 mm longae, 9-nerves, mucronatae; palea 4 ad 5 mm longa, 5-nervis, paullo convoluta, hyalina; lodiculae 2, minutae, ovatae, longe fimbriatae. Stamina 6, libera, linearia, filamentis incrassatis, antheris 4 mm longis, apiculo parce hirsuto, acuminato. Ovarium ovatum, in stylum longum puberulum attenuatum, stigmatibus 3 plumosis. Caryopsis globosus, glaber, siccitate niger, 6 mm diametro, glumis persistentibus suffultus, apice paullo depressus et mucronatus; pericarpium tenue, facile solutum; semen pericarpio conforme; embryone ad basim in scutello eximie sericeo-hirsuto incluso, radicula libera.

LUZON, Province of Rizal, Montalban, *Bur. Sci. 5222 Topping*, July, 1908: Province of Nueva Vizcaya, Quiangan, *Merrill 126*, June, 1902. MINDORO, summit of Mount Calavite, *For. Bur. 9500 Merritt*, February, 1908, altitude 1,200 to 1,400 m. I also identify with this, *probably, Loher 1661* (Herb. Kew.), from the Tangso River, Luzon, May, 1890, but the flowers are very imperfect.

This species comes near to *S. Dielsianum* and *S. acutiflorum*, but has the spikelets much less acute, the leaves thicker and crowded at the ends of the

branchlets, and the fruit with only a minute apiculus instead of the large conical one of the latter species. Topping's specimens have both flowers and fruits, the latter most interesting in structure. Merritt gives the common name as *usiu* and describes the plant as "climbing," and yet "very shrubby on top of the mountain and not more than 1 m high, below larger and of regular size;" Merrill says that it reaches 40 feet in height and is very straight and erect. His specimens are slightly abnormal, being from broken culms, but the spikelets and leaves agree with the chief type. He has referred his specimen to *Bambusa lumampao* Blanco, which more probably is *Schizostachyum acutiflorum* Munro.

8. **Schizostachyum Curranii** Gamble sp. nov.

Culmus fruticosus, scandens, fistulosus; internodia viridia, scabra; vaginae chartaceae, glabrae, striatae, apice truncatae, ligulis longiusculis, parce setaceo-fimbriatis. Folia chartacea, glabra, lanceolata vel ovato-lanceolata, apice longe setaceo-acuminata, basi subcordata, marginibus scabra, 12 ad 20 cm longa, 2 ad 3 cm lata; nervi utrinque 7 vel 8, perobscuri; petiolus brevis, 3 mm longus; vaginae glabrae, striatae, ore oblique truncatae, ligulis longiusculis. Flores in paniculis axillaribus in culmis foliiferis, ad 70 cm longis; ramuli multi ad nodos racemos vaginatos ferentes; vaginae lineari-lanceolatae, stramineae, glabrae, 1 ad 3 cm longae; racemi spiculis 1 ad 6 alternatim dispositis et stramineo-bracteatis. Spiculae oblongo-lanceolatae, glabrae, 8 mm longae; ultima ♀, ebracteata, inferiores ☿ vel ♂, bracteatae et bracteolis binis parvis bicarinatis, ciliatis; glumae steriles 2 vel 3, ovatae, longe mucronatae, 5–7-nervatae, 5 ad 6 mm longae; fertilis minor, convolutus, 5 mm longus; palea minima, hyalina; lodiculae 2 vel 3, ovatae, obtusae, 1 mm longae, apice longe fimbriatae. Stamina linearia, 3 mm longa, apiculo plumoso 1 mm longo. Ovarium puberulum attenuatum, stigmatibus plumosis, floris ♀ glabrum, basi incrassatum. Fructus ignotus.

Luzon, Province of Benguet, Lusod-Bayabas trail, altitude 2,000 m, *For. Bur. 10849 Curran*, December, 1908.

9. **Schizostachyum luzonicum** Gamble sp. nov.

Culmus suffruticosus, 1 ad 2 m altus, parce fistulosus, glaber, nitidus; internodia 20 ad 25 cm longa, 1 cm diametro; vaginae 3 ad 5 cm longae, glabrae, margine ciliatae, ore fimbriato-auriculatae, pseudophyllis triangularibus longe acuminatis; ramuli stricti, folia et flores ferentes. Folia coriacea, glabra, pallida, versus apices ramulorum congesta, lanceolata, apice acuminata, basi cordata, marginibus cartilagineis, 10 ad 20 cm longa, 2 ad 3.5 cm lata; nervi obscuri, utrinque 8 ad 10; petiolus latus, 3 ad 5 mm longus; vaginae glabrae, nitidae, ore fimbriato-auriculatae, ligulis brevissimis. Flores in paniculis vaginatis lateralibus vel terminalibus foliis suffultis, 15 ad 60 cm longis; rachis alternatim sinuatus; glomeruli pauciflores singuli vel in spicis basi vaginati, vagina glabra, 10 ad 15 mm longa, aristata margine ciliata; bracteae parvae, 3 vel 4, ovatae, longe ciliatae, spiculis 3 quarum una longior et fertilis. Spiculae lineari-fusiformes, aristatae, 1 cm longae; glumae steriles 2 vel

3, ovatae, longe mucronatae, I 7 mm, II 8 mm, III 7 mm; fertilis 5 ad 6 mm; palea 4 ad 5 mm, hyalina, convoluta; omnes 5–9-nervatae, marginibus eximie albo-ciliatis; lodiculae ovatae, longe fimbriatae. Stamina 6, linearia, glabra, 2 mm longa, apice obtusa, rotundata, scabra. Ovarium (immaturum) complanatum, puberulum, stigmatibus brevibus pilosis. Fructus ignotus.

LUZON, Province of Zambales, altitude 800 m, *For. Bur. 8411 Curran & Merritt*, December, 1907, *For. Bur. 5926 Curran*, January, 1907, in moist places on rocky hills.

A remarkable reed-like species, noticeable by the coriaceous leaves and the long-white-ciliate margins of the glumes. It seems to have no resemblance to any of the other species I have seen.

10. **Schizostachyum Merrillii** Gamble sp. nov.

Culmus fruticosus, fistulosus, scaber, 2 cm diametro. Folia chartacea, pallida, glabra, anguste linearia, apice acuminata, basi acuta, marginibus scabra, 7 ad 15 cm longa, 7 ad 10 mm lata, longitudinaliter corrugata, nervi obscuri, utrinque 3; petioli 2 ad 3 mm longi; vaginae nitidae, ore truncatae, parce ciliatae, ligulis brevibus fimbriatis. Flores terminales in ramulis foliiferis, in spicis gracilibus vaginatis parce ramosis vix 10 cm longis. Spiculae 1 ad 5, distichae, in spicis parvis ad nodos vaginatos, rachillis minutis separatae, ultima major fertilis, rachilla terminali, inferiores aliquando imperfectae; vaginae muticae, stramineae, 8 mm longae; glumae vacuae parvae, 1 vel 2, aristatae, florens 1 cm longa, dorso minute sericea, longe aristata; palea subaequilonga, aristata, convoluta. Stamina 6, libera, 5 mm longa, apice obtusa. Ovarium lineare in stylum longum productum, stigmatibus plumosis. Fructus ignotus.

LUZON, Province of Rizal, Antipolo, *Merrill 1744*, March, 1903.

Only one specimen of this is available, but it is sufficiently good to indicate a well-marked species.

7. DINOCHLOA Büse.

Climbing shrubs.
- Leaves broad.
  - Lodicules absent; caryopsis globose; floral rachis glabrous.....1. *D. scandens*
  - Lodicules present; caryopsis oblong; floral rachis pubescent.. 2. *D. pubiramea*
- Leaves narrow; no lodicules.
  - Culms smooth; caryopsis globose..... 1. *D. scandens* var. *angustifolia*
  - Culms rough; caryopsis oblong..... 3. *D. Aguilarii*

Herbaceous undershrubs; lodicules present..... 4. *D. Elmeri*

1. **Dinochloa scandens** O. Kuntze Rev. Gen. Pl. (1891) 773.

Bambusa scandens Bl. ex Nees in Flora **7** (1824) 291.

Dinochloa Tjankorreh Büse in Miq. Pl. Jungh. (1854) 388; Miq. Fl. Ind. Bat. **3** (1859) 415; Munro in Trans. Linn. Soc. **26** (1868) 153, *t. 5* (*excl. 4, 5*); Kurz in Ind. Forester **1** (1876) 352; F.-Vill. Nov. App. (1880) 324; Gamble in Ann. Bot. Gard. Calc. **7** (1896) 112, et in Hook. f. Fl. Brit. Ind. **7** (1897) 414; Pilger in Perk. Frag. Fl. Philip. (1904) 150; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29, 392.

POLILLO, *Bur. Sci. 10416 McGregor*, also (probably), *Bur. Sci. 10415 McGregor.* PALAWAN, Puerto Princesa, *Bur. Sci. 276 Bermejos*, January, 1906; Casuarina Point, *Bur. Sci. 621 Foxworthy*, March, 1906. BALABAC, *Bur. Sci. 447 Mangubat*, March, 1906, near the seashore. BASILAN, *For. Bur. 3980, 3981 Hutchinson.* MINDORO, Bongabong River, *For. Bur. 3701, 4066 Merritt*, March, 1906. MINDANAO, District of Davao, *Copeland 1239*, April, 1904: Lake Lanao, Camp Keithley, *Mrs. Clemens 1176*, September, 1907.

This species seems to be widespread in the southern islands. The following are given as vernacular names: *baia* (Foxworthy); *bacaue* (Mangubat); *bucao* (Hutchinson); *usiu, bolocaui* (Merritt). Copeland's specimens have fruit which is very interesting in structure. The caryopsis is globose, black, smooth, 3.5 mm in diameter, tipped with the style and 3-lobed stigma, and supported at the base by the persistent glumes. The pericarp is easily separated and the scutellum of the seed is apparently a thin gelatinous film enclosing the embryo and half of the endosperm and semi-adherent to the pericarp.

Var. **angustifolia** Hackel ex Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 392.

LUZON, Province of Laguna, *Cuming 637*, 1836; Mount Maquiling, *Merrill 5145*, March, 1906, *Elmer*, April, 1905: Province of Bataan, Mount Mariveles, *For. Bur. 2102 Borden*, November, 1904. MINDORO, Pola, *Merrill 2224*, May, 1903; Balete River, *For. Bur. 6135 Merritt*, January, 1907. MINDANAO, District of Davao, Todaya, *Copeland 1239*, in part, April, 1904: District of Zamboanga, *For. Bur. 9235 Whitford & Hutchinson*, January, 1908. BASILAN, *Hallier*, January, 1904.

Local investigation, including especially an examination of the mature culms, the culm-sheaths, and the ripe fruit, may show this to be a species distinct from *Dinochloa scandens.* Borden gives the vernacular name as *timac;* Merrill and Merritt give it as *usiu.*

2. **Dinochloa pubiramea** Gamble sp. nov.

D. scandens O. Ktze. var. *pubiramea* Merrill MS. in Herb. Manila.

Frutex scandens; culmi 2.5 cm diametro, subscabri, nodis incrassati et geniculati. Folia chartacea, apice setaceo-acuminata, basi plus minus inaequaliter rotundata, utrinque glabra vel infra minutissime puberula, marginibus scabra, 17 ad 27 cm longa, 2 ad 5 cm lata; nervi utrinque 13 vel 14, vel in foliis angustis pauciores; petioli lati, crassi, 2 ad 4 mm longi; vaginae longae et longe persistentes, nitidae, dorso carinatae, apice oblique truncatae nudae; ligulis parvis ciliatis. Flores in capitulis minutis, distantibus vel continuis, vel in racemis brevibus, secus ramulos filiformes panicularum longarum ex axillis in culmis foliiferis; ramuli vaginati, vaginis stramineis lanceolatis, superioribus acuminatis, inferioribus pseudophylla ferentibus; internodia gradatim minora, ultima pubescentia sicut etiam bracteolae capitularum. Spiculae in capitulis fertiles paucae, bracteolis paleaceis multis obtusis admixtae; glumae steriles 2, I 1.5 mm longa, glabra, latissima, prôfunde emarginata et apiculo acuto, II I similis sed 2.5 mm longa et minus emarginata; florens (valva) 3 mm longa, lata, minute apiculata, 7-nervia; palea ovato-acuta, apice ciliata, vix convoluta, 2 ad 3 mm longa; lodiculae 3, minimae, 1 mm longae, ovatae, longe fimbriatae. Stamina 6, libera, antheris 1.5 mm longis,

apiculo longiusculo hirsuto. Ovarium oblongum vel obovatum. Stylo brevi, stigmatibus 3, longis, plumosis. Caryopsis (immatura) oblonga, apice nitida, obtusa, stylo indurato terminata.

MINDANAO, Province of Surigao, Mount Biantung, *Bolster 319*, May, 1906. BASILAN, near Isabela, *For. Bur. 3977 Hutchinson*, February, 1906. NEGROS, Sicaba River, *Everett*, July, 1906.

I am of the opinion that there is ample reason to separate this from *Dinochloa scandens*, not only on account of the pubescent panicle-rachis, but also on account of the emarginate glumes, long-plumose stigmas, and the presence of lodicules. Hutchinson gives the vernacular name as *bucao*, Everett as *cauayan*.

3. **Dinochloa Aguilarii** Gamble sp. nov.

Frutex scandens; culmi parce fistulosi, opaci, scabri, 1 ad 2 cm lati; ramuli ad nodos fasciculati, foliiferi breves, floriferi longissimi, foliiferi pergraciles, rigidi, ad nodos incrassati, geniculati. Folia membranacea, glabra, lineari-lanceolata, apice rigide et scabre setaceo-acuminata, basi rotundata, uno latere scabra, 6 ad 13 cm longa, 10 ad 16 mm lata; nervi utrinque 4 ad 6; petioli vix ulli; vaginae tenues striatae, glabrae vel puberulae, ore ciliis paucis (3 vel 4) rigidis, longioribus ornatae, ligulis pubescentibus. Flores in spicis brevibus bracteatis secus ramulos tenuissimos panicularum longarum terminalium florentium vel interdum foliiferarum, bracteae lanceolatae bracteolis obtusis minutis. Spiculae minimae, 3 mm longae, glabrae; glumae steriles 2, I ovata obtusa, 1 mm, II late ovata, 2 mm, florens (valva) 3 mm oblonga; palea valvae aequilonga, hyalina. Stamina 6, libera, antherae lineares, 2 mm longae, apiculis puberulis. Ovarium basi ovatum in stylo tenui productum, stigmate late plumoso. Caryopsis oblonga, glabra, 4 mm longa, apiculo rigido conico, 1 mm longo, basi glumis persistentibus suffulta; pericarpium crassum; semen pericarpio conforme infra ad unum latus scutello plano conspicuo sub embryone minuto ornatum.

LUZON, Province of Bulacan, Angat, *For. Bur. 11163 Aguilar*, March, 1908: Province of Ilocos Norte, Mount Piao, *For. Bur. 14010 Merritt & Darling*, November, 1908, altitude 1,000 m: Province of Nueva Ecija, *For. Bur. 8588 Curran*, January, 1908: Province of Bataan, Mount Mariveles, *Holman 1049*, April, 1910. BASILAN, *Hallier*, January, 1902.

This seems to me to be quite distinct from *D. scandens* var. *angustifolia*, in the scabrous culms, the thin leaves, and the quite different caryopsis. At the same time, I have ventured to describe it as a separate species only with some diffidence, for I feel that as all the available *Dinochloa* specimens are more or less imperfect in some respect, nothing will really set right their separation but a careful and complete study on the spot. None of the specimens have any culm-sheaths, only one has fruit, and some have the flowers far too young for study. Aguilar gives the vernacular name as *baito;* Curran as *esu*.

4. **Dinochloa Elmeri** Gamble sp. nov.

Suffrutex parvus semiherbaceus, basi solum plus minus lignosus; culmi pergraciles, molles, vix 50 cm alti; ramuli geniculati. Folia membranacea, lanceolata, apice acuminata, basi rotundata, margine ex-

teriore scabra, caeterum glabra, 5 ad 7 cm longa, 6 ad 15 mm lata, nervi utrinque 3 vel 4, obscuri, petioli 1 ad 1.5 mm longi; vaginae molles, striatae, scabrae, apice truncatae, minute ciliatae, ligulis petiolo aequilongis. Flores in spiculis minutis spicatis terminalibus vaginatis, alternatim distantibus; vaginae parvae, puberulae, 1.5 mm longae. Spiculae oblongae, ad 4.5 mm longae; glumae vacuae 2, minutae, emarginatae, puberulae, ciliatae, I 1 mm, II 1.5 mm longa; gluma florens late emarginata, in sinu mucronata, 7-nervia, pubescens, 2.5 mm longa, 3.5 ad 4 mm lata; palea florenti similis, convoluta, apicis alis utrinque angulatis, apice solum obscure 2-carinata; lodiculae 1 ad 3 (?), spathulatae, glabrae, rarissimae. Stamina 6, libera, 3 mm longa, linearia, apiculo scabro. Ovarium lanceolatum, stylo tenui, stigmatibus 2 vel 3, pilosis. Caryopsis oblonga, 5.5 mm longa, 4 mm lata, basi glumis suffulta, apice rostrata; pericarpium a semine facile solutum.

LUZON, Province of Benguet, Mount Santo Tomas, *Elmer 6542*, June, 1904. NEGROS, Canlaon Volcano, *Bur. Sci. 1140 Banks*, June, 1906, doubtful.

A very curious and interesting plant, "rare in the mossy forest at the summit of the mountain" (Elmer). It seems to me to be distinctly a *Dinochloa*, but better specimens may possibly alter this opinion and possibly even prove it to belong to a new genus. Banks' specimen is like a small wiry *Panicum* and has no flowers.

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ADDITIONS TO THE BORNEAN FERN FLORA.

By EDWIN BINGHAM COPELAND.

(*From the College of Agriculture, Los Baños, P. I.*)

Dryopteris glabrior Copel. spec. nova.

A D. crenata (Forst.) O. K. fronde majore graciliore, multo laxiore, ubique multo glabriore, soris minoribus differt.

Gunong Kapor, near Bidi, *leg. C. J. Brooks.*

D. crenata is unknown in Borneo. While the differences between this species and *D. crenata* are all only of degree, they are so marked that they justify treating the two plants as specifically distinct. *D. glabrior* is the more primitive of the two.

Dryopteris penangiana (Hook.) C. Chr. var. **calvescens** (Christ) (*D. ferox* var. *calvescens* Christ).

Bengkarum, near summit, *leg. C. J. Brooks, No. 27.*

The species is known from continental Asia; and this form, which in spite of its stature is more nearly related to this species than to *D. ferox*, has been found in Mindanao and Negros.

PROTOLINDSAYA Copel. genus novum.

Rhizomate repente, paleis angustis vestito, fasciculo vasculari tenue SOLIDO; pinnis inaequilateralibus non dimidiatis, venulis liberis; soris intramarginalibus haud confluentibus, obconicis, lateribus indusiorum ad laminam adnatis.

Protolindsaya Brooksii Copel. spec. nova.

Rhizomate 1 mm crasso, paleis rufescenti-brunneis, 1 mm longis; stipitibus adscendentibus, 3–5 cm altis, deorsum castaneis, sursum rhachique plerumque viridescentibus; fronde 5–7 cm alta, 1 cm lata, acuminata, pinnata, ubique glabra; pinnis alternantibus, utroque latere 10–12, infimis brevi-stipitatis, maximis 7 mm longis, 3 mm latis, cuneatis, in segmenta ca. 3 obtusa oblonga incisis, venula in segmento quoque una; pinnis medialibus fere aequalibus ad apicem inciso-crenatis vel integris; pinnis supremis adnatis, oblanceolatis, obtusis, monophlebiis; soro ad apicem intramarginalem venulae, 0.5 mm lato, paullo altiore, margine libera indusii integra rotundata.

Gunong Bengkarum, altitude 1,050 m, *leg. C. J. Brooks, No. 47:* growing in and beside a very cold stream.

This little fern is unmistakably related to *Saccoloma moluccanum* (Bl.) Mett., and to *Lindsaya cultrata* (Willd.) Sw. The pinnae strongly resemble the ultimate pinnules of *S. moluccanum*, and the sori are alike except in position. The rhizome and the aspect of the plant are like the *Lindsaya*. The origin of *Lindsaya, Schizoloma* and *Odontosoria* has always been a mystery, to which this fern offers a very interesting clue. I by no means believe that *P. Brooksii* is itself the ancestor of *Lindsaya* or *Odontosoria* or *Saccoloma;* but it presents so interesting a combination of the characteristics their common ancestors must have had, that it is reasonable to suppose that it has retained with less modification the less specialized, more generalized character of the more primitive and now unknown real ancestor.

In the same connection it may be observed that *S. moluccanum* is with doubtful propriety referred to *Saccoloma*. It has had at least four specific names in *Microlepia*, to which its affinity is clear.

Schizoloma heterophyllum (Dry.) J. Sm. var. **Speluncae** Copel. var. nova.

Stipite 4–10 cm alto nisi versus basin castaneam viride; fronde ca. 5 cm alta; pinnis maximis 33 mm longis, 12 mm latis, obtusis, basibus late cuneatis fere aequilateralibus, integris vel rarissime subincisis, membranaceis; venulis laxe anastomosantibus; soris vix marginalibus, continuis.

Sandakan, in a cave at base of sandstone cliff, facing the sea, *Foxworthy 578.*

Except for the suspicion that the peculiar environment may be responsible for the thin, broad, entire pinnæ, I would not hesitate to describe this as a new species.

Asplenium trifoliatum Copel. spec. nova.

Euasplenium foliis maximis, rhizomate suberecto, 7 mm crasso, lignoso, radices validas multas emittente, dense paleaceo, paleis membranaceis ovato-lanceolatis integris acuminatis 6 mm longis brunneis; stipitibus 15–20 cm altis, confertis, paleaceis, paleis sursum minoribus et subdeciduis; fronde pinnata; pinna utroque latere una, decurrenti-adnata, ca. 12 cm longa, 3–5 cm lata, caudata; pinna terminale 40 ad 50 cm alta, fere 10 cm lata, caudata, argute serrata, herbacea, supra glabra, atro-viride, infra pallidiore, et ad costam atro-brunneam prominentem et sparsissime squamulis minutis ad laminam paleacea; soris laete brunneis, inaequalibus, costa et margine remotis, vix 1 mm latis, indusio persistente, sporis cornutis.

Sambas, near Tringos, on rocks in low-lying jungle, *leg. C. J. Brooks, No. 26.*

In some respects this species strongly suggests *A. epiphyticum* Copel., of Mindanao, which I regard as a probable source of the genus *Stenochlaena.* It has also enough characteristics in common with *A. squamulatum* to make their affinity very probable. It may, therefore, well represent the connection between *Thamnopteris* and the larger and probably older group, *Eu-asplenium.* On the two fronds sent me I find only two pairs of veins anastomosing at the margin. The veins end uniformly in elongate hydathodes.

Asplenium filiceps Copel. spec. nova.

Caudice lignoso, 5 mm crasso, paleis lanceolatis apiculatis castaneis marginibus pallidioribus dense vestito; stipitibus confertis, ca. 10 cm longis, tenuibus, viridibus, ut lamina inferiore frondis sparse minute squamulosis, squamulis pallide brunneis; fronde simplice 20–24 cm longa, 20–24 mm lata, utrinque angustata, angustissime longe caudata, obscure serrata, subcoriacea; venis liberis; soris vix ad costam et haud ad marginem attingentibus, ca. 8 mm longis; indusiis albidis persistentibus.

Tringos (source of Sarawak river), *leg. C. J. Brooks, No. 21.*

This species is in the group of *A. squamulatum* Bl. which seems remarkably well represented in this region. It is nearest to *A. Natunae* Baker, from which it differs in margin and texture. It is the most caudate plant in the group.

Plagiogyria pycnophylla (Kze.) Mett. var. **integra** Copel. var. nova.

Marginibus integris, vix etiam ad apices pinnarum serrulatis, pinnis gracilibus.

Mount Bengkarum, near summit, *leg. C. J. Brooks.*

Polypodium Zippelii Bl.

Mount Bengkarum, *leg. C. J. Brooks, No. 33.*

Apparently new to Borneo.

Dryostachyum ?

Mr. Brooks collected at the summit of Bengkarum a large fern which is what might be expected as a hybrid of *Polypodium heracleum* and *Dryostachyum splendens*, neither of which is known to occur in Borneo. Only a few segments are fertile; these are not at the apex and are not much contracted. The sori are composite, but not to the same degree as in *Dryostachyum*.

Lecanopteris pumila Bl.

Matang Mountain, July, 1908, *leg. J. Hewitt.*

This is the same fern as is found in Mindanao, and, though notably large, can hardly be other than that figured by Blume.

Vittaria longicoma Christ Ann. Jard. Buit. II 5 (1905) 129.

Sarawak River, near Tringos, altitude 400 m. *leg. C. J. Brooks, No. 17.*

The fronds reach at most a length of 55 cm, the paleæ are only 4 mm long, and the sori are interrupted, but I think it must be this species, known only from Borneo. The spores are reniform and the paraphyses have narrowly cyathiform heads. This is very near *V. isoetifolia* Bory, but longer, and the paleae are narrower, less toothed, and with a very long filiform apex.

Elaphoglossum petiolatum (Sw.) Urban.

Summit of Bengkarum, *leg. C. J. Brooks, No. 30.*

New to Borneo.

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THE FLORA OF MOUNT PULOG.

By E. D. MERRILL and M. L. MERRITT.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, and from the Bureau of Forestry, Manila, P. I.)

The entire northwestern part of Luzon, west of the Cagayan Valley, is high and mountainous, the region being essentially that of a cordillera or a series of cordilleras, in which the streams are deeply incised, having sharp V-shaped valleys. The topography is generally that of youth, with here and there isolated table-lands, of which the Baguio plateau is the principal one. Above the general upland of from 1,200 to 1,600 m elevation a number of peaks arise, some of which attain an altitude of nearly 2,900 m. Mr. Eveland,[1] in discussing the central cordillera, considers it to be the master axis of Luzon, and probably one of the original tectonic axes of the Asiatic continent, formed by a wrinkling of the more plastic crust of the earth as the globe has contracted. In it the oldest of the Philippine rocks are found, and on it all the agencies of construction and destruction have been at work since the Philippine Islands, as such, originated.

The geology of north-central Luzon is only incompletely known, but in general the region may be said to consist of a core of dioritic rock, overlying which is found a rather confused mass of eruptive rocks, in the main, andesites. On the flanks of this core, dipping east and west are Tertiary sediments, limestones, and shales, which may have once extended over the whole region in the form of a broad anticline. Specimens from rock outcropping on the summit of Mount Pulog proved to be andesite.

Dr. Warren D. Smith, of this Bureau, thinks that probably at the end of the Miocene, at the time of the great earth movements which took place all over the world, a period of ore deposition occurred in the Philippines. In the area under discussion there are two principal centers of ore deposition, the copper deposits about Mancayan, northwest of Mount Pulog, and the gold deposits near Baguio. The later history of this part of

[1] *This Journal* 2 (1907) *Gen. Sci.* 217.

the country, from a geologic standpoint, has been more or less uneventful. No indications of glaciation have been found, so that we may infer that the climatic conditions have been essentially the same since the beginning of the Tertiary, or since these Islands emerged from the sea.

From this region the Agno River flows southward through a deep and narrow valley until it reaches the plain of Pangasinan, where it spreads out, turns to the west and north, and flows into Lingayen Gulf. The Abra River drains the west-central part of the region, flowing generally in a westerly direction and emptying into the China Sea at Vigan. The northern and northwestern parts are drained by smaller streams, while the eastern portions are drained by the tributaries of the Cagayan River. This stream is the longest and largest in Luzon, flows northward and empties into the China Sea at Aparri, on the north coast of the island.

Between these main river systems is found the central cordillera of Luzon, the culminating peak of which is the high mountain known to all the local inhabitants, at least to those on the Benguet side, as Mount Pulog, or Pulag, as it is sometimes pronounced. It is situated in the northeastern part of Benguet subprovince, on the boundary between that subprovince and Nueva Vizcaya.

The government of this region is at present organized into what is known as the Mountain Province, comprised of several subprovinces, some of which, like Benguet, have approximately the same geographical limits as defined on the Spanish maps of the region, while the boundaries of others have been more or less changed. The entire region is for the most part inhabited by non-Christian aborigines, subdivided into numerous tribes, each tribe speaking a different language or dialect. The Mountain Province comprises what is defined on the Spanish maps as Benguet, Lepanto, Bontoc, Abra, and parts of Nueva Vizcaya, as well as portions of other of the neighboring provinces. The physical characteristics and the flora of the greater part of this area are for most part quite uniform. In the present paper, for convenience, the area under discussion is designated under the collective name Benguet-Lepanto region.

Mount Pulog, undoubtedly the highest peak in Luzon, and ranking in altitude next to Mount Apo, of southeastern Mindanao, among Philippine mountains, is situated at about 60 kilometers from the coast, on the central range, its approximate position being latitude N. 16° 30′ 36″ and longitude E. 120° 50′ 20″. The name and position of the mountain does not appear on any published map of the Philippines that we have been able to examine, and although it is by far the most prominent peak in the entire region, it seems to have been overlooked by the earlier explorers. There are several reasons why the mountain so long escaped attention, one of the chief being that it is apparently in no place visible from the coastal plain of northern Luzon, on account of the high intervening coast range. Under favorable weather conditions it is probable that

the peak can be seen from certain places in the China Sea, as conversely the sea can be seen from the summit of the mountain in clear weather, but from such points it would be more or less confused by the many neighboring peaks. The Agno Valley in earlier days was apparently the chief inland route of travel from Baguio northward. Owing, however, to the depth and narrowness of the valley and the high mountains bordering both sides, the mountain can be seen in only a few places, notably in the vicinity of the little village of Adouay. From higher points in the vicinity of Baguio, the summer capital of the Philippines, Mount Pulog, when the weather is clear, is visible as a somewhat bald-looking peak at a distance of about 45 kilometers to the northeast, but much of the time it is enshrouded in clouds.

Magnificent views of the mountain are to be had, under favorable weather conditions, from a number of points on the mountain trail leading northward from Baguio along the range on the west side of the Agno River. Baguio, however, as a resort for Americans and Europeans, dates only from about the year 1902, and has only been easily accessible since 1905. During the period of Spanish occupation it is probable that the region north of Baguio was visited by only a limited number of white men, and it is also probable that the mountain trail leading northward from Baguio was used only to a limited extent by others than the Igorots. Under these conditions it is not surprising that the mountain so long escaped attention.

Various peaks in this mountainous region have, from time to time, been credited with the distinction of being the highest in northern Luzon, although popular opinion usually attributed that distinction to Mount Data, a peak nearly 600 m less in altitude, near the boundary between the subprovinces of Benguet and Lepanto, some miles to the north of Mount Pulog. Mount Data doubtless earned its reputation from the fact that the earlier explorers entered the region by the valley of the Abra River, and probably did not penetrate sufficiently far to the south to secure a view of the peaks beyond the Data range. The northern slopes of Mount Data, as seen from the Abra Valley, are very abrupt, and the mountain is certainly the most prominent one as seen from the western and more accessible parts of that region. During the Spanish dominion, moreover, several scientists and collectors, such as Richard von Drasche, John Whitehead, and A. Loher, visited Mount Data, so that in a way the mountain became better known than the neighboring peaks.

Mount Pulog was observed by Dr. E. B. Copeland and E. D. Merrill in October, 1905, from the Agno Valley, near Adouay, and again in November of the same year from Pauai, on the range west of the Agno River. Doctor Copeland at the time expressed the opinion that the peak was the highest one in the region, but no instruments for making observa-

tions were at hand, and no opportunity was had at the time of the trip to make an ascent of the mountain.

The highest peak, then, escaped careful observation until January. 1907, when it was ascended by Mr. Charles Benson, a surveyor in the Bureau of Public Lands. Mr. Benson had charge of the execution of free patent surveys and a river and trail survey in the Mountain Province during the years 1906, 1907, and 1908, and in January, 1907, made the first ascent of Mount Pulog of which we have any record. Regarding this trip, the following is quoted from Mr. Benson's report to Capt. Charles H. Sleeper, Director of Lands:

> **"On the 5th of January, 1907, we ascended Mount Pulog, 9,500 feet, and passed a night on its summit, the next morning having the delight and surprise of seeing over half an inch of ice on the pools of water just below the peak."**

Mr. Benson's party erected a large tripod and flag on the highest peak, to serve as a triangulation station, and later observations on this point determined the altitude of the peak as 2,880 m (9,480 feet), or somewhat over 200 m higher than any other point in the region.

In Mr. Benson's survey, distances were determined by the stadia method. Elevations were carried along the traverse lines by vertical angles. Elevations of prominent points were determined by vertical angles and triangulation methods from the stations of the traverse lines. The Agno River line was carried into the Mancayan-Suyoc mining region, and checked within 4 m in elevation with the line brought in from Candon by Mr. Goodman, formerly of the division of mines, Bureau of Science.

There appears therefore, to be little doubt but that Mount Pulog is the highest peak not only in the region, but in Luzon, judging from Mr. Benson's estimates, as well as from observations made by the Forestry Bureau party, and noted later. To Mr. Benson is due the credit of making this fact known to geographers and to science in general. The first definite published information regarding the mountain is that contained in a short account of Mr. Benson's trip, written by Dr. M. L. Miller, entitled "The Ascent of Mount Pulog." [2]

Whether or not there had been any previous ascent of Mount Pulog by white men, can not, of course, positively be stated, but careful inquiries made by the Forestry Bureau party of a number of natives living in the vicinity, elicited only the information that to their knowledge no white men, other than Mr. Benson and his party, had ever previously attempted to climb the mountain. According to reports of some of these Igorots, a native officer of the Philippine Constabulary had once crossed the main ridge of the Pulog range very close, if not quite to the summit of the highest peak, some years previously while searching for some offenders. There is a well-defined and apparently considerably traveled trail leading

[2] *This Journal* **3** (1908) *Gen. Sci.* 99, 100.

from Benguet subprovince eastward over the Pulog range into Nueva Vizcaya, passing through the upper village on the Benguet side, Ankiki, over the mountain to the small settlement known as Tinuk or Tinak, on the Nueva Vizcaya side. This trail passes through the summit grass lands immediately south of the main peak, at an altitude of less than 200 m below the top. It was the one followed by Mr. Benson's party, and all succeeding ones that have made the ascent of the mountain.

The name "Pulog," or "Pulag," as nearly as could be learned from the Igorots living in the vicinity, signifies "falling off," referring to the extremely steep and often precipitous sides of the mountain. Mr. Merritt also reports a current local superstition to the effect that the mountain was the place to which the spirits of departed Igorots went after death, but he was unable to secure any satisfactory confirmation that the belief was generally accepted.

The second ascent of Mount Pulog was made in January, 1909, the party consisting of Messrs. H. M. Curran, M. L. Merritt, and T. C. Zschokke, foresters in the Philippine Bureau of Forestry, accompanied by Maximo Ramos, botanical collector for the Bureau of Science, and N. Penes and F. Madamba, student assistants, Bureau of Forestry. While this party was working in the vicinity of Baguio during the beginning of a field trip that had been undertaken for the purpose of determining the forest cover of northern Luzon, a copy of Mr. Benson's map was secured, and the decision was at once made to attempt the ascent of Mount Pulog. It was believed that the mountain would command a good view of the entire surrounding region, and this belief subsequently proved to be true. This party spent from January 2 to 8 on the mountain. The third ascent was made by Dr. E. B. Copeland and Mr. E. D. Merrill, accompanied by several American school-teachers who had been attending the summer assembly at Baguio, including Mr. and Mrs. E. B. Baldridge. This party was on the mountain from May 11 to 13, 1909. The fourth ascent was made by Mr. R. C. McGregor, of the Bureau of Science, July 2 to 5, 1909. The mountain has since been ascended by Governor-General Forbes and party.

All parties made the start for the mountain from Lutab, a village situated on the east bank of the Agno River. Lutab can be reached from Baguio by two routes, either by the trail leading to Ambuklao, there crossing the Agno River, and leading northward through the towns of Bokod, Daklan, and Adouay, or by the Baguio-Cervantes trail, leading northward along the ridge west of the Agno River, leaving this trail at Balangabang or at Pauai, and decending approximately 1,200 m to the Agno River, crossing that stream at Adouay.

A short distance south of Lutab a fair Igorot trail is found leading from the river valley eastward up the steep slopes to the top of the first ridge, altitude approximately 1,300 m. The trail then follows the contour line

to the east for a distance of between 4 and 5 kilometers, drops to a small stream at an altitude of about 1,170 m, and crosses this stream near the junction of two branches, one draining the west slope of Mount Pulog, the other draining the north or northwest slope. From this point the ascent is by a rapid rise, the slope up to an altitude of about 2,360 m being from 30° to 40°. The small Igorot settlement of Alam-am is found on this trail at an altitude of about 1,500 m, and above this the last settlement on the Benguet side, Ankiki, situated at an altitude of about 2,000 m (2,190 m according to Mr. Benson), at the upper limits of the pine forest. The trial leads steadily upward from Ankiki, but from here on it passes through the dense mossy forest instead of through open pine forests and grass covered slopes that characterize the region below an altitude of 2,000 m. At an altitude of about 2,500 m the trail emerges from the mossy forest and passes into the summit grass lands, characterized by more gentle slopes, continues eastward and passes over the mountain immediately south of the highest peak.

As noted above, Mr. Benson determined the altitude of the mountain to be 2,890 m. The Forestry Bureau party made a careful test for altitude by determining the boiling point of water. This was done several times, both at the extreme top and at the camp, which was situated at some distance below the summit. At camp the boiling point of water was 91° C., and at the summit was between 90.1° and 90.2° C. This gives an altitude of about 2,889 m (9,507 feet) at the summit, practically the same as that determined by Mr. Benson by other methods. All other altitudes cited in this paper are from aneroid barometer readings.

The summit of Mount Pulog is doubtless subject to comparatively low temperatures. Mr. Benson records the fact that at the time of his visit, January, 1908, ice more than 1 cm in thickness formed at night at his camp, a short distance below the summit. None of the other parties encountered ice, but the temperature was disagreeably cold, especially in misty or rainy weather and at night. Records made by the Forestry Bureau party, on the ascent, are as follows: Altitude 1,500 m, at night, 15.5° C; at 6 a. m., 16°; at 8.15 a. m., 18°: altitude 1,800 m, 9 a. m., 19°: altitude 2,250 m, 11.50 a. m., 15.5°: summit, altitude 2,890 m, 11.50 a. m., 10°, weather misty, and with a strong wind blowing.

Plate I shows the temperature registered at different times during the trip of the Forestry Bureau party. For convenience in observing the daily range of temperature, the records for each day have been connected with lines. From an examination of the chart (Plate I) it will be observed that the temperature on January 3, a wet, misty day, was practically the same at noon as at midnight.

Mount Pulog, although situated in a region generally characterized by a heavy rainfall from June to November and by drier weather from January to April, is probably somewhat protected by the mountains to the west, and as a result possibly receives a lighter rainfall than does the

coast range. There is, however, no direct evidence on this subject, and the deeply gullied slopes of the mountain bear evidence of torrential rains.

The following rather incomplete weather notes were taken by the Forestry Bureau party:

January 1.—(Agno River). Dry; light clouds.

January 2.—(Agno River to 1,500 M). No rain; sky nearly clear all day; light mists and clouds after 5 p. m., and more or less all night.

January 3.—(1,500 m to summit). Alternately clear and misty in the forenoon; continuous heavy mists after 10 a. m., and all night.

January 4.—(Summit). Mists all the forenoon; clouds breaking away in the afternoon; mists at night.

January 5.—(Summit). Clear all day.

January 6.—(Summit). Generally clear, with light clouds.

January 7.—(2,100 m). Fair weather; light clouds at times.

January 8.—(2,100 m to Agno River). Clear weather.

The weather during the ascent in May, 1909, was similar to that noted above, but one afternoon rather heavy rain, with considerable wind, was experienced. In July, Mr. McGregor experienced light showers the first day, the second and third days the summit was clear in the morning and more or less misty all day after about 9 a. m. In general, so far as observations made on such short trips are of value, the mountain seems to be clear in the morning, becoming enshrouded in clouds at about 9 a. m., and continuing more or less in this condition the remainder of the day.

The top of Mount Pulog is a high, rolling plateau, including perhaps between 1,500 and 2,500 hectares. Near the north-central part of this area a higher knoll rises about 250 m above the general level to form the extreme summit. From this grass-covered plateau the sides, which are covered with dense thickets, fall off abruptly, as a literal interpretation of the name "Pulog" implies. So steep are these slopes, in fact, that a collecting party sent out by the Forestry Bureau expedition, although accustomed to all kinds of mountain climbing, was forced to turn back from one of the slopes, after descending to an altitude of about 1,800 m, the loose crumbling earth making further progress absolutely dangerous. Other slopes appeared to be quite similar to this one, except the one extending eastward toward the Agno River, which is less steep.

In most places the soil is fairly deep, apparently formed for the greater part by the rapid decomposition of rock in place. Outcropping ledges are the exception, although some low cliffs are to be found, and boulders are common in ravines and gullies. The rock formation, at least of the summit, is andesite.

The view from the summit of Mount Pulog, which is uninterrupted in all directions, is probably unsurpassed in the Philippines. Directly to the north the distant view is obscured by the comparatively high peaks

known as Aki, Bulbul, Natoo, Palugloko, and Panotoan, while in the distance is the eastward extension of the Polis Range, culminating in the high peak called Amuyao, distinctly visible to the northeast. Farther to the northeast the view is lost in the hazy distance of the great Cagayan Valley. To the east a view is to be had of practically the entire Province of Nueva Vizcaya, limited to the south by the eastward extension of the central cordillera, the Caraballo Sur Mountains, and to the east by the distant coast range beyond the Cagayan Valley. In this view the Magat River and its larger tributaries are prominent. To the south, besides the naturally prominent spurs of Mount Pulog itself, are to be seen a series of prominent peaks of the central cordillera, such as Libung, Palansa, Puadan, and Ugo. Beyond the valley of the Agno River the great plain of Pangasinan extends southward to Manila Bay, bounded on the extreme west by the Zambales range, and limited to the south only by the indistinct sea and the fairly distinct outlines of Mount Mariveles, about 200 kilometers distant; Mount Arayat in Pampanga Province is distinctly visible. The view somewhat to the southwest shows the distinct outlines of Mount Tonglon (Santo Tomás) and Mount Kias, the location of Baguio, and the ranges and valleys intervening between Mount Tonglon and Mount Pulog; beyond is the Lingayen Gulf, and in the near view the impressive valley of the Agno River, the stream being visible only for a short distance, about 2,000 m below, near the village of Adouay. Directly to the west are the interior mountains of the coast range, the ridge averaging at least 1,700 m in height, the peaks in places reaching 2,250 m in altitude; especially prominent is the high, broad ridge known as Pauai, with the still higher peak of Singakalsa a short distance to the north. To the northwest are the near mountains and ridges east of the Agno River, the more distant ones west of that stream, and still farther away the sharp peaks of the Malaya or Montserrat Range in Lepanto subprovince, south of Cervantes. At various places glimpses are to be had of the China Sea, but at no place to the west is the coastal plain of Luzon visible.

TYPES OF VEGETATION.

In the ascent of Mount Pulog four main types of vegetation are noted, the first three of which are characteristic of the entire Benguet-Lepanto region, the fourth being apparently entirely confined to Mount Pulog. The steep slopes leading up from the river are covered almost entirely with grass, although scattered broad-leaved shrubs and small trees are found in the gullies and stream depressions; this grass-covered area extends to an altitude of about 1,200 m. The second formation encountered is an open forest belt in which the pine (*Pinus insularis* Endl.) is the characteristic tree, which extends upward to an altitude of about 2,200 m. The third formation, the mossy forest,

extends from the upper limits of the pine region to an altitude varying from 2,500 m to 2,600 m. The fourth formation, the open, grass-covered summit, extends from the upper limits of the mossy forest to the top of the mountain. Mount Pulog is apparently the only peak in the entire region that has an area of grass land succeeding the mossy forest; all the other peaks are forested to the summit.

Probably moisture and temperature are the two factors which exercise the greatest influence on the formation of these vegetative types. The dry slopes of the lower parts of the Agno Valley seem to be too low in altitude, and too warm for the growth of the pine, although it is doubtful if the moisture conditions differ to any appreciable extent from those in the pine belt above. Both the grassy region and the pine forest belt are characterized by steep slopes and dry, well-drained soil of fair depth.

At an altitude of about 2,000 m, which is above the general level of many of the mountain ranges of the region, there is a great increase in the humidity of the atmosphere. Observations made in January, May, and July, indicate that those portions of Mount Pulog and the other higher mountains of the Benguet-Lepanto region above an altitude of about 2,000 m are frequently enshrouded in damp misty clouds and that at the above altitude rains are frequent when at the same time the air in the valleys at lower altitudes is entirely clear. No doubt this condition is due to the condensation of moisture on contact of the upper strata of the air with the higher and cooler peaks after the air has passed over the warmer hills and mountains below.

The moist condition of the air and consequently of the soil, combined with a somewhat lower temperature, favors the growth of hardwood trees, and while it is probably not unfavorable to the pine, for very scattered pine trees do occur both in the mossy forest and on the open grass-covered summit, the hardwoods crowd out the pines in the former habitat. The upper part of the mountain, above the present limits of the mossy forest, is higher than the neighboring mountain peaks and is subject to the full force of the wind; it may also be above the main cloud belt of the mountain, although this is uncertain, and can only be verified by continuous observation, for sometimes the summit is clouded when the mossy forest is clear, and vice versa. The exposed nature of the open peak, the unbroken sweep of the winds over its area, probably the lower average temperature, and probably some local differences in the distribution of moisture account for the absence of trees and shrubs on the upper parts of the mountain; it is possible, however, that the present limits of the summit grass lands may be due in part to fires that have been started from time to time by the natives. Mr. McGregor reports that a small area on the main peak had been burned over a short time before his visit to it in July, and

traces of fires were observed by Mr. Curran. The almost continuous damp conditions prevailing on the summit would, however, seem to be opposed to any theory involving the occurrence of extensive grass fires as effecting the limits of the summit grass lands. No traces of fires have been observed in the mossy forest on other peaks in the region.

I. THE GRASS-COVERED LOWER SLOPES.

The steep slopes of the Agno Valley below an altitude of 1,200 m are characteristically grass covered, the prevailing species being *Themeda triandra* Forsk., intermixed with various other species, both finer and coarser, and with scattered herbaceous plants. In the more moist ravines and gullies a few broad-leaved shrubs and small trees occur, but the pine, which is characteristic of the entire Benguet-Lepanto region as a whole, is entirely wanting. This same condition is noticeable for a long distance southward along the Agno River, and for some distance northward until the river reaches an altitude of about 1,000 m, beyond which point the pine trees occur down to the river banks.

II. THE PINE REGION.

The pine region occupies the main bulk of the mountain slopes and extends over the summits of most peaks and ridges that do not attain an altitude of more than 2,000 m. In this area, which extends from an altitude varying from 1,000 to 1,200 m up to 2,000 m, or in places somewhat higher, depending somewhat on local conditions, the pine, *Pinus insularis* Endl., is the characteristic tree, forming an open park-like forest. The trees are almost invariably scattered, and it is only in favorable localities that they are close enough entirely to shade the ground. These pines are of moderate size, most of the trees ranging from 45 to 90 cm in diameter, and from 15 to 30 m in height, although in protected places they are larger. Generally the trees show the effect of storms, the tops of most of them being more or less shattered by the winds. On the open slopes the pine is practically the only tree to be found, but in the gullies and stream depressions throughout the altitudinal distribution of the pine, broad-leaved trees and shrubs are quite common. Most of these trees and shrubs, at least in the lower parts of the pine region, are widely distributed species at low altitudes in the Philippines, but find favorable habitats in the Benguet-Lepanto region only in gullies and stream depressions. Prominent among the trees and shrubs in these ravines are *Pipturus asper* Wedd., *Melicope luzonensis* Engl., *Bischofia javanica* Bl., *Mallotus ricinoides* Muell.-Arg., *Acalypha stipulacea* Klotz., *Ficus hauili* Blanco, *F. nota* Merr., *F. cumingii* Miq., *Premna odorata* Blanco, *Guioa perrottetii* Radlk., *Pittosporum pentandrum* Merr., *Ehretia philippinensis* DC., and *Randia wallichii* Hook. f. At higher altitudes in these ravines other arborescent species occur, such as *Saurauia elegans* F.-Vill., *Vaccinium benguetense* Vid., *Itea macrophylla* Wall.,

Wendlandia glabrata DC., and *Deutzia pulchra* Vid. Numerous species of herbaceous plants, ferns, etc., are also to be found in these ravines.

On the open slopes under the pine trees the ground cover is characteristically composed of grasses, the most prominent ones being *Themeda triandra* Forsk., *Miscanthus sinensis* Andr., *Rottboellia ophiuroides* Benth., and various species of *Andropogon* (prominent in the fall months). Next in abundance to the grasses is the common brake, *Pteridium aquilinum* Kuhn, while among other herbaceous plants, species belonging to the *Compositae* and *Labiatae* are most abundant. Small shrubs associated with the pines are *Rubus fraxinifolius* Poir., *R. elmeri* Focke, *R. ellipticus* Sm., *Rosa multiflora* Thunb., *Viburnum luzonicum* Rolfe, and *Glochidion luzonense* Elm.

Most of the above-mentioned plants have a considerable altitudinal range, but other characteristic ones are to be noted at various altitudes. For a short distance above and below 1,300 m, the pitcher plant, *Nepenthes alata* Blanco is common; at an altitude of about 1,600 m, the first tree-ferns, *Cyathea contaminans* Copel., are noted, as well as a thistle, *Cirsium luzoniense* Merr. Prominent among the herbaceous plants in various parts of this area are the ferns *Balantium copelandii* Christ, *Dryopteris beddomei* O. Ktze., *D. setigera* O. Ktze., *Odontosoria chinensis* J. Sm., *Drynaria rigida* Bedd., and such flowering plants as *Dianella ensifolia* Red., *Lilium philippinense* Bak., *Aletris spicata* Franch., *Polygonum chinense* L., *Anemone vitifolia* Ham., *Kalanchoe spathulata* DC., *Desmodium sinuatum* Bl., *Osbeckia chinensis* L., *Epilobium philippinense* C. B. Rob., *Buddleia asiatica* Lour., *Leucas mollissima* Wall., *Plectranthus diffusus* Merr., *Calamintha umbrosa* Benth., *Sopubia trifida* Ham., *Elephantopus mollis* H. B. K., *Ageratum conyzoides* L., *Solidago virgaurea* L., *Aster trinervius* Roxb., *Anaphalis adnata* DC., *A. contorta* Hook. f., *Gnaphalium hypoleucum* DC., *G. japonicum* Thunb., *Spilanthes grandiflora* Turcz., *Emilia pinnatifida* Merr., and *Lactuca dentata* C. B. Rob. The pine trees bear numerous specimens of various parasitic *Loranthaceae* of the genera *Loranthus* and *Viscum*.

On the open slopes the dividing line between the pine region and the mossy forest is comparatively sharply defined, but in the ravines a number of characteristic constituent species of the latter formation extend downward for a greater or less distance; on the other hand, very few species characteristic of the pine region extend into the mossy forest, and those that are found there are apparently mostly casuals.

III. THE MOSSY FOREST.

On practically all the higher peaks and ridges in the Benguet-Lepanto region that reach an altitude of 2,000 m and above, is found a characteristic formation that is generally called the mossy forest. Considered as a whole this forest is made up of a dense stand of small, irregularly shaped trees, comprising numerous species, the ground, and trunks and

branches of the trees being covered with a profusion of mosses, scale-mosses, lichens, etc., while epiphytic ferns and orchids are very abundant. The larger trees in the lower part of this formation on Mount Pulog are sometimes 60 cm in diameter and from 13 to 30 m high, but most of them are smaller and shorter than this, and as a rule, grow progressively smaller and more stunted as altitude is gained. On sharp ridges, exposed to the full force of the wind, the constituent species remaining approximately the same, the plants become very much dwarfed and frequently much distorted, forming characteristic elfinwood. The trees are not of uniform size in any part of such forests, small ones being invariably crowded together between and under the larger ones.

On Mount Pulog this belt of mossy forest extends from the upper limits of the pine region at an approximate altitude of 2,000 m, to an altitude varying from 2,500 to 2,600 m, according to the configuration of the open top; on all other ridges and mountains in the Benguet-Lepanto region where this formation occurs, it apparently extends to the highest peaks, and this seems to be true of the other mountains of the Philippines, wherever the mossy forest is found, with the exception of some active volcanoes. Mount Halcon in Mindoro, however, has a well-defined heath formation, consisting of undershrubs and ferns intermixed with grasses at an altitude of about 2,400 m, but this is succeeded by a dense mossy forest or elfinwood that extends to the summit of the mountain.

On Mount Pulog, at least at certain seasons, when viewed from the open mountain top, this mossy forest presents a peculiar grayish shade, caused by the color of the leaves of *Leptospermum flavescens* Sm., and by the fact that the ultimate branches of nearly all the trees are bare and exposed, due to the effect of the prevailng winds; the presence of certain species of lichens in considerable quantities on the branches of the trees accentuates the prevalent grayish tinge of the vegetative type.

In this formation the prevalent upper story or larger growing trees are *Eugenia acrophila* C. B. Rob., *Leptospermum flavescens* Sm., *Podocarpus imbricatus* Bl., *Quercus* spp., *Symplocos* spp., *Eurya* spp., *Taxus baccata* subsp. *wallichiana* Pilg., and *Neolitsea macrocarpa* Merr. *Leptospermum flavescens* Sm. is the largest tree in the area, but in the upper limits it becomes much dwarfed and here hardly exceeds 10 m in height. All have much-branched, spreading, scraggly habits of growth, there being practically no large, straight-boled trees in the forest.

The most common constituents of the undergrowth or second story trees and shrubs are *Debregeasia longifolia* Wedd., *Berberis barandana* Vid., *Drimys piperita* Hook. f., *Hydrangea lobbii* Max., *Polyosma philippinensis* Merr., *Pittosporum resiniferum* Hemsl., *Rubus copelandii* Merr., *Evodia reticulata* Merr., *E. dubia* Merr., *Skimmia japonica* Thunb., *Glochidion merrillii* C. B. Rob., *Ilex crenata* Thunb., *Perrottetia alpestris* Loesen., *Daphne luzonica* C. B. Rob., *Medinilla* spp., *Aralia hypoleuca*

Presl, *Schefflera* spp., *Clethra luzonica* Merr., *Diplycosia luzonica* Merr., *Rhododendron subsessile* Rendle, *Vaccinium* spp., *Ardisia* spp., *Discocalyx philippinensis* Mez, *Loheria bracteata* Merr., *Rapanea philippinensis* Mez, and *Psychotria* spp.

A considerable number of herbaceous plants are noted, such as *Viola toppingii* Elm., *Begonia merrittii* Merr., *Ellisiophyllum pinnatum* Makino, *Peracarpa luzonica* Rolfe, *Rubus pectinellus* Max., *Boenninghausenia albiflora* Reichb., *Sarcopyramis delicata* C. B. Rob., *Coleus* spp., *Hemiphragma heterophyllum* Wall., *Galium gaudichaudii* DC., *Gynura macgregorii* Merr., *Senecio luzoniensis* Merr., *Myriactis humilis* Merr., *Veronica monantha* Merr., and others; among the grasses are *Agrostis elmeri* Merr., *Aniselytron agrostoides* Merr., and some species of *Isachne,* and among the *Cyperaceae* a number of species of *Carex.* Nearly all the mosses and scale-mosses listed in the following enumeration, as well as the majority of the ferns and nearly all the orchids are from the mossy forest.

The upper limits of the mossy forest are sharply defined from the summit grass lands, being bordered by a very dense thicket consisting mostly of *Rhododendron subsessile* Rendle, *Eurya* spp., *Symplocos* sp., *Daphne luzonica* C. B. Rob., and especially a dwarfed bamboo, *Arundinaria niitakayamensis* Hayata, the last often forming pure stands.

IV. THE SUMMIT GRASS LANDS.

So far as is known Mount Pulog is the only mountain in the Philippines that presents above the mossy forest a well-defined grass-covered area; in this character it differs remarkably from all the neighboring mountains and high ridges. Above an altitude varying from 2,500 to 2,600 m practically the entire top of the mountain is a large meadow. The soil is apparently deep and fertile, and rock outcrops are not numerous or extensive. An examination of one of the valleys showed an excellent sandy loam soil at least 30 cm in depth, and a bolo thrust into the ground below this gave no sign of underlying rock. Although the soil has every evidence of fertility, the Igorots state that no cultivation has ever been attempted in this region.

A very few scattered pine trees, *Pinus insularis* Endl., comprise the entire arborescent flora of this area, while shrubs are apparently confined to scattered individuals of *Rhododendron subsessile* Rendle, growing usually near rock outcrops.

The turf covering this area is composed of a considerable number of grasses and sedges, intermixed with a few herbaceous plants, and this flora, from a scientific standpoint, is perhaps the most interesting one on the mountain. Among the grasses to be noted are the comparatively coarse, widely distributed and here much dwarfed *Miscanthus sinensis* Andr., with the finer species, *Anthoxanthum luzoniense* Merr.,

Calamagrostis filifolia Merr., *Deschampsia flexuosa* Trin., the last two being perhaps the predominant species in the formation, while much reduced specimens of *Arundinaria niitakayamensis* Hayata, a dwarfed bamboo, are to be noted, especially near the borders of the mossy forest. *Cyperaceae* are represented by *Scirpus pulogensis* Merr., *Carex rara capillacea* Boott, *C. tristachya pocilliformis* Kükenth., and *Uncinia rupestris* Raoul. Other plants are *Luzula effusa* Buch., *Sagina procumbens* L., *Smilax pygmaea* Merr., *Ranunculus philippinensis* Merr. & Rolfe, *Halorrhagis micrantha* R. Br., *Anaphalis contorta* Hook. f., and *Gentiana luzoniensis* Merr. Below is given a list of all the species collected in the summit grass lands, 37 in number, excepting the few mosses, scale mosses, and lichens.

Peranema luzonica Copel.; on ledges.
Polystichum auriculatum Presl; on ledges.
Currania gracilipes Copel.; on ledges.
Asplenium stantoni Copel.; on ledges.
Plagiogyria nana Copel.; on ledges.
Pinus insularis Endl.; very scattered.
Miscanthus sinensis Andr.; abundant.
Isachne pangerangensis var. halconensis Hack.; rare.
Anthoxanthum luzoniense Merr.; fairly abundant.
Calamagrostis filifolia Merr.; very abundant.
Deschampsia flexuosa Trin.; abundant.
Monostachya centrolepidoides Merr.; rare.
Arundinaria niitakayamensis Hayata; abundant locally.
Scirpus pulogensis Merr.; abundant.
Schoenus apogon R. & S.; rare.
Schoenus axillaris Poir.; rare.
Gahnia javanica Moritzi; only near the borders of the mossy forest.
Uncinia rupestris var. capillacea Kükenth.; rare.
Carex rara subsp. capillacea Boott; rather common.
Carex tristachya var. pocilliformis Kükenth.; rather common.
Eriocaulon depauperatum Merr.; in seepage pools, shallow water.
Luzula effusa Buchenau; only near rock outcroppings.
Smilax pygmaea Merr.; abundant locally.
Chamabainia cuspidata Wight; apparently rare.
Sagina procumbens Linn.; apparently rare.
Ranunculus philippinensis Merr. & Rolfe; in depressions only.
Hypericum pulogense Merr.; abundant locally.
Viola toppingii Elm.; in depressions only.
Halorrhagis micrantha R. Br.; carpeting the Igorot footpath.
Rhododendron subsessile Rendle; near rock outcroppings only.
Vaccinium villarii Vid.; near rock outcroppings.

Gentiana luzoniensis Merr.; scattered, prominent only when the sun is shining, the flowers being then open.

Wahlenbergia bivalvis Merr.; apparently not abundant.

Myriactis humilis Merr.; only near rock outcroppings.

Anaphalis contorta Hook. f.; scattered.

Cirsium luzoniense Merr.; scattered.

A total of 37 species on an area of 2,000 hectares is a decidedly poor flora. It is probable that the above list represents practically all the species represented in the summit grass lands, at least those that produce flowers during the first six months of the year. About 25 of the total number represent northern or Asiatic types, while associated with these are several species that manifestly represent Australasian types, *Schoenus apogon, S. axillaris, Uncinia, Ranunculus,* and *Halorrhagis.* But a single species, *Isachne pangerangensis* can be considered as a Malayan type.

Table showing the families and the number of genera, species, etc., of the Pulog flora.

Orders and families.	Genera.	Species.	Endemic species.	Introduced species.	Confined to the Benguet-Lepanto region in the Philippines.	
					Genera.	Species.
BRYOPHYTA:						
Marchantiaceæ	1	1				
Jungermanniaceæ	12	22	4		6	20
Musci	30	34	15		13	24
PTERIDOPHYTA:						
Hymenophyllaceæ	2	3	3			1
Cyatheaceæ	2	3	2			1
Polypodiaceæ	33	77	21		2	31
Gleicheniaceæ	1	2	2			1
Equisetaceæ	1	1				
Lycopodiaceæ	1	3				
Selaginellaceæ	1	2	2			
GYMNOSPERMÆ:						
Taxaceæ	2	2				
Pinaceæ	1	1	1			
ANGIOSPERMÆ:						
Gramineæ	27	36	9	2(?)	9	16
Cyperaceæ	9	18	2		1	10
Araceæ	3	3	2			
Eriocaulaceæ	1	1	1			1
Juncaceæ	1	1				1
Liliaceæ	6	8	2		3	4
Dioscoreaceæ	1	1	1			
Cannaceæ	1	1	1	1		
Orchidaceæ	9	19	15			10
Piperaceæ	2	3	2			
Chloranthaceæ	1	1				
Fagaceæ	1	3	3			2
Moraceæ	1	6	6			1

Table showing the families and the number of genera, species, etc., of the Pulog flora—Continued.

Orders and families.	Genera.	Species.	Endemic species.	Introduced species.	Confined to the Benguet-Lepanto region in the Philippines.	
					Genera.	Species.
ANGIOSPERMÆ—Continued.						
Urticaceæ	9	12	4		4	10
Loranthaceæ	3	7	6		1	4
Balanophoraceæ	1	1	1			
Polygonaceæ	1	3				2
Chenopodiaceæ	1	1		1		
Amaranthaceæ	1	1				
Caryophyllaceæ	4	4		1	2	2
Ranunculaceæ	3	4	2		2	3
Berberidaceæ	1	1	1		1	1
Magnoliaceæ	2	2	1			
Lauraceæ	2	4	3			2
Cruciferæ	2	2				1
Nepenthaceæ	1	1	1			
Droseraceæ	1	1				
Crassulaceæ	3	3	1		1	1
Saxifragaceæ	5	5	1		1	1
Pittosporaceæ	1	2				
Rosaceæ	4	13	6		2	8
Leguminosæ	10	11	1	3	2	3
Oxalidaceæ	1	1				
Rutaceæ	4	5	3		2	3
Meliaceæ	1	1	1			1
Euphorbiaceæ	11	16	8			5
Coriariaceæ	1	1			1	1
Anacardiaceæ	1	1	1		1	1
Aquifoliaceæ	1	4	3			2
Celastraceæ	1	1				
Staphyleaceæ	1	1				
Sapindaceæ	1	1	1			
Sabiaceæ	1	1	1			
Rhamnaceæ	2	2	1		1	1
Vitaceæ	2	2				
Tiliaceæ	2	2				
Malvaceæ	1	1				
Dilleniaceæ	1	1	1			
Theaceæ	2	3	3			2
Guttiferæ	1	2	1			1
Violaceæ	1	1	1			1
Begoniaceæ	1	2	2			1
Thymelaeaceæ	2	2	2		1	1
Elaeagnaceæ	1	1	1			
Myrtaceæ	4	4	1	1		1
Melastomataceæ	4	6	4			4
Onagraceæ	1	1	1		1	1
Halorrhagidaceæ	1	1				
Araliaceæ	2	6	5			1
Umbelliferæ	1	1				
Clethraceæ	1	1	1			1
Ericaceæ	3	5	5			1

Table showing the families and the number of genera, species, etc., of the Pulog flora—Continued.

Orders and families.	Genera.	Species.	Endemic species.	Introduced species.	Confined to the Benguet-Lepanto region in the Philippines.	
					Genera.	Species.
ANGIOSPERMÆ—Continued.						
Myrsinaceæ	6	8	7			3
Primulaceæ	1	1				
Symplocaceæ	1	3	3			1
Oleaceæ	1	1	1			
Loganiaceæ	1	1				
Gentianaceæ	2	2	2		1	2
Asclepiadaceæ	3	3	2			2
Convolvulaceæ	1	1		1		
Boraginaceæ	3	3	1		1	1
Verbenaceæ	2	3	3			2
Labiatæ	7	9	5	1	2	6
Solanaceæ	3	7	3	2		3
Scrophulariaceæ	8	8	1		5	5
Gesneriaceæ	2	3	3			2
Acanthaceæ	5	6	2			4
Rubiaceæ	10	13	6	1	1	7
Caprifoliaceæ	3	4	2		1	1
Cucurbitaceæ	2	3				
Campanulaceæ	3	3	1		2	2
Compositæ	31	39	13	3	11	20
Totals	357	528	224	17	81	251

In the above table representatives of 357 genera and 528 species are considered, of which 17 species are undoubtedly introduced plants in the Philippines. Endemic genera are represented by *Merrilliobryum, Currania, Aniselytron, Monostachya, Cleistoloranthus, Loheria,* and *Merrittia,* four being proposed in the following enumeration. Endemic species amount to 224, or about 42 per cent of the whole, approximately the same percentage of endemism as is found on Mount Mariveles in the Province of Bataan, Luzon.

The flora of the Benguet-Lepanto region, in the area approximately limited by the regional distribution of *Pinus insularis* Endl., is quite different from that of the remainder of the Philippines and is essentially Asiatic rather than Malayan. In this region are to be found most of the strictly continental and boreal types of plants that occur in the Philippines, and a great number of these northern types are not found on even the highest mountains south of Benguet. In this same region many genera, characteristic of the Malayan flora as a whole, are unrepresented, although more or less abundantly distributed in other parts of the Archipelago. Representatives of 81 genera are found on Mount Pulog alone that for the most part are widely distributed in the Benguet-Lepanto

region, but which have as yet have no known representatives in other parts of the Philippines. The number of species present on Mount Pulog that are confined to the Benguet-Lepanto region, so far as their Philippine distribution is concerned, is 251, or nearly 50 per cent of the total number considered in the following enumeration.

The flora of Mount Mariveles [3] in the Province of Bataan, Luzon, a much lower peak than Mount Pulog, and situated at about 200 kilometers south of the latter mountain, and of Mount Halcon,[4] Mindoro, ranking among the higher peaks in the Philippines, and situated at approximately 350 kilometers south of Mount Pulog, and on another island, have been somewhat investigated, and data regarding the vegetation of the two have been compiled, so that a rough comparison between the floras of the three peaks is possible. In making this comparison, however, it should be borne in mind that in the case of both Mount Mariveles and Mount Halcon many species from the lower slopes are included, and in the case of the former, all the plants known from a certain area extending from sea level to the summit of the highest peak are considered; in the case of Mount Pulog, situated as it is in an elevated region, many of the widely distributed species characteristic of the low country are naturally eliminated, and nothing can be considered below an altitude of about 1,000 m.

On Mount Halcon, considering only the phanerogams and vascular cryptogams, representatives of 28 families, 158 genera, and 530 species were found, that have not been seen on Mount Pulog, and vice versa, 27 families, 176 genera, and about 380 species are found on Mount Pulog that have not been found on Mount Halcon. Only 67 species of 58 genera are common to both Mount Halcon and Mount Pulog, and a high percentage of these are widely distributed on most of the higher mountains of the Archipelago, and many of them extend to other mountains in the Malayan region outside of the Philippines.

In the case of Mount Mariveles, the comparison results approximately the same; of the 587 genera and 1,117 species recorded from the Lamao Forest Reserve, only about 80 species, representing nearly that number of genera, have also been found on Mount Pulog.

The evidence at hand seems to show that the flora of the mountains in the central and southern Philippines is essentially Malayan, while that of the mountains in the Benguet-Lepanto region is very decidedly Asiatic, containing a great number of Himalayan types, and presenting the limits of the southeastern extension of the Himalayan flora.

The dominant and characteristic species of the Benguet-Lepanto region is the pine, *Pinus insularis* Endl., a species very closely allied to and

[3] *This Journal* 1 (1906) *Suppl.* 1–141.
[4] *L. c.* 2 (1907) *Botany* 251–309.

perhaps not really specifically distinct from *Pinus khasya* Royle, of the mountains of Khasia, Chittagong, and Burma. In the Philippines *Pinus insularis* Endl. is widely distributed in the present Mountain Province, extending northward from southern Benguet through Lepanto, Bontoc, and Abra subprovince as well as parts of Ilocos Norte and somewhat eastward into Nueva Vizcaya, a homogeneous area; an isolated and restricted area is found in the mountains of Zambales Province, Luzon, while the allied species, *Pinus merkusii* DeVr., is found also in Zambales Province and in western Mindoro. So far as our general collections from Zambales and the pine region of Mindoro show, at least some of the other species associated with the pine in the Benguet-Lepanto region are also found in these two localities. As a rule, however, the species so characteristic of the Benguet-Lepanto region are not found south of the mountains limiting the southern boundary of Benguet. Occasional ones, such as *Pinus insularis* Endl., *Deutzia pulchra* Vid., *Microlaena stipoides* R. Br., *Sageretia theezans* Brongn., *Senecio luzoniensis* Merr., and *Lobelia nicotianaefolia* Heyne, are found also on the higher mountains of the Zambales range, while others, such as *Taxus baccata* subsp. *wallichiana* Pilg., *Cirsium luzoniense* Merr., *Ainsliaea reflexa* Merr., etc., extend still farther southward to Mount Banajao; still others are found on Mount Halcon, Mindoro, including *Drosera peltata* Sm., *Vaccinium barandanum* Vid., *Ainsliaea reflexa* Merr., *Isachne pangerangensis* Z. & M., and *Arundinaria niitakayamensis* Hayata. This southern range is not surprising when it is considered that the altitudes of all of the mountains discussed approximate that of the average peaks in the Benguet-Lepanto region. Moreover the Zambales range, although separated from the central cordillera by the Pangasinan-Pampanga plain, is distinctly visible from the higher peaks of Benguet, even from such distant ones as Pulog, while the central cordillera forms a nearly complete connecting chain with Mount Banajao. The absence of the majority of the characteristic species of the Benguet-Lepanto region from peaks of approximately the same altitude situated farther to the south, is probably largely due to unfavorable climatic conditions, such as relatively higher temperatures, differences in exposure, rainfall, humidity, etc., and also to the fact that on these southern mountains, at least on their more tropical lower and medium slopes, the struggle for existence among the various species is much greater than in the elevated comparatively temperate Benguet-Lepanto region.

The Benguet-Lepanto region, as intimated above, is characterized by a great number of species that must be considered as of continental or Asiatic origin, rather than as Malayan types. Some data regarding the northern element in the Philippine flora have previously been published,[5]

[5] *This Journal* 1 (1906) *Suppl.* 174–177.

and in the following enumeration of what are considered to be northern types in the Pulog flora, those species previously considered are not discussed except where additional data have been secured. Prominent among the northern types found on Mount Pulog are the following 112 species: *Peranema luzonica* Copel., the only other species in the genus from the mountains of India and western China, *Dennstaedtia scabra* Moore, India and China, *Athyrium anisopteron* Christ, southern China, *A. drepanopteron* A. Br., Japan to northern India, *Woodwardia radicans* Sm., *Adiantum edgeworthii* Hook., India and China, *Taxus baccata* subsp. *wallichiana* Pilg., *Pinus insularis* Endl., *Pollinia quadrinervis* Hack., *Arthraxon ciliaris* Beauv., *A. microphyllus* Hochst., *Arundinella setosa* Trin., *Panicum villosum* Lam., *Anthoxanthum luzoniense* Merr., *Aristida cumingiana* Trin., *Agrostis elmeri* Merr., *Aniselytron agrostoides* Merr., a new genus and species with northern affinities, *Calamagrostis filifolia* Merr., *Deschampsia flexuosa* Trin., widely distributed in the north temperate zone, *Monostachya centrolepidoides* Merr., a new genus and species with entirely northern affinities, *Brachypodium sylvaticum* Beauv., *Arundinaria niitakayamensis* Hayata, previously known only from Formosa, *Scirpus pulogensis* Merr., closely allied to *S. pauciflorus* Lightf., of Europe and northern Asia, *Carex,* 9 species, including *C. breviculmis* subsp. *royleana* Nees, India to Japan and Formosa, *C. rara* Boott, and *C. tristachya* Thunb., Japan to China and Formosa, *Eriocaulon depauperatum* Merr., closely allied to a Himalayan species, *Luzula effusa* Buchenau, eastern Himalaya and southern China, *Lilium philippinense* Bak., also found in Formosa, *Disporum luzoniense* Merr. (*D. pullum* of previous list), *Ophiopogon japonicus* Ker, *Aletris spicata* Franch., *Smilax china* L., *S. pygmaea* Merr., very closely allied to a Japanese species, *Lecanthus peduncularis* Wedd., India to China, *Chamabainia cuspidata* Wight, *Arenaria serpyllifolia* Linn., widely distributed in temperate regions, *Sagina procumbens* Linn., range of the preceding, *Anemone vitifolia* Ham., Himalayan region to Formosa, *Ranunculus philippinensis* Merr. & Rolfe., *Berberis barandana* Vid., *Cardamine regeliana* Miq., *Sedum australe* Merr., *Astilbe philippinensis* Henry, *Deutzia pulchra* Vid., *Itea macrophylla* Wall., *Rosa multiflora* Thunb., *Fragaria indica* Andr., *Rubus ellipticus* Sm., *R. pectinellus* Maxim., *Shuteria vestita* W. & A., *Indigofera nigrescens* Kurz, Khasia to China, *Boenninghausenia albiflora* Reichb., *Skimmia japonica* Thunb., *Coriaria intermedia* Mats., *Pistacia luzoniensis* Merr. & Rolfe, allied to Asiatic species, *Ilex crenata* Thunb., China and Japan, *Sageretia theezans* Brongn., *Rhamnus pulogensis* Merr., closely allied to Asiatic species, *Hypericum pulogense* Merr., allied to Chinese forms, *Viola toppingii* Elm., allied to Himalayan forms, *Daphne luzonica* C. B. Rob., perhaps occurring also in China, *Sarcopyramis delicata* C. B. Rob., *Epilobium*

philippinense C. B. Rob., allied to a Himalayan species, *Lysimachia ramosa* Wall., *Gentiana luzoniensis* Merr., *Swertia decurrens* C. B. Rob., allied to Asiatic forms, *Sarcostemma brunonianum* W. & A., India and Ceylon, *Cynoglossum furcatum* Wall., India to Japan, *Scutellaria luzonica* Rolfe, *Leucas mollissima* Wall., India to Formosa, *Plectranthus diffusus* Merr., *Calamintha umbrosa* Benth., eastern Europe to India, China, and Japan, *Hemiphragma heterophyllum* Wall., Himalayan region to Formosa, *Veronica monantha* Merr., the genus mostly in the north temperate zone, *Sopubia trifida* Ham., *Euphrasia borneensis* Stapf, *Ellisiophyllum pinnatum* Makino, mountains of India to Japan and Formosa, *Rungia parviflora* Nees, India to China, *Galium* spp., *Lonicera rehderi* Merr., *Viburnum luzonicum* Rolfe, *V. odoratissimum* Ker, *Lobelia nicotianaefolia* Heyne, India and Ceylon, *Peracarpa luzonica* Rolfe, *Ethulia conyzoides* L., *Eupatorium benguetense* C. B. Rob., allied to Chinese forms, *Solidago virgaurea* Linn., *Myriactis humilis* Merr., *Aster philippinensis* Moore, *Anaphalis adnata* DC., and *A. contorta* Hook. f., mountains of India and China, *Gnaphalium hypoleucum* DC., India to Japan, *Carpesium cernuum* L., *Artemisia capillaris* Thunb., Manchuria to Formosa, *Senecio confusus* Elm., *S. luzoniensis* Merr., *Cirsium luzoniense* Merr., *Ainsliaea reflexa* Merr., *Sonchus arvensis* Linn., and *Lactuca dentata* C. B. Rob., Japan to China and Formosa.

The cellular cryptogams show the same floristic relationships as do the vascular cryptogams and phanerogams, as evidenced by the known distribution of *Schisma sikkimense* Steph., *Pogonatum miscrostomum* R. Br., *Pilotrichopsis dentata* Besch., *Meteorium helminthocladum* Fleisch., *Leptohymenium tenue* Schwaegr., and *Plagiothecium neckeroideum* Bryol. eur. About one-fifth of the total number of species found on Mount Pulog show northern affinities, and very few of these northern types are found in the Philippines south of the Benguet-Lepanto region.

The Australasian element in the Pulog flora, although not represented by a great number of species, presents several of special interest, and it is at least a peculiar state of geographical distribution to find here, associated with Himalayan types, a considerable number that must be considered characteristic of the Australasian flora. Prominent among these are *Paesia luzonica* Christ, allied to a species from New Caledonia, *Blechnum fraseri* var. *philippinense* Copel., the species in New Zealand, *Microlaena stipoides* R. Br., the genus otherwise unknown from north of Australia, *Carex graeffeana* Boeckl., also in Fiji, *Kyllinga intermedia* R. Br., Formosa, Australia, and Fiji, *Schoenus apogon* R. &. S., and *S. axillaris* Poir., the latter now for the first time reported from north of Australia, *Uncinia rupestris* Raoul, the first representative of the genus to be found north of the equator in the eastern hemisphere, and

identical with a New Zealand form, *Dianella caerulea* Sims, New Guinea and Australia, *Clematis macgregorii* Merr., allied to forms found in Australia and southeastern Malaya, *Halorrhagis micrantha* R. Br., *Leptospermum flavescens* Sm., and *Drimys piperita* Hook. f., representatives of typical Australasian genera, *Euphrasia borneensis* Stapf, *Veronica monantha* Merr., and *Ranunculus philippinensis* Merr. & Rolfe, although representing genera characteristic of the north temperate zone, still in the case of all three species most closely allied to Australian and New Zealand forms, *Galium gaudichaudii* DC., and *Spilanthes grandiflora* Turcz.

This Australasian element can be divided into two categories, the first representatives of genera or groups that manifestly have developed in Australia, being characteristic of that continent, and that have migrated northward, and the second those that manifestly have reached their greatest development in the northern hemisphere, and that have migrated to Australia through Malaya. Manifestly a large part of the flora of northeastern Australia is of Malayan origin, and any theory of geographic distribution that would account for the presence of these Malayan plants in Australia must likewise provide for a migration of Australian types northward; the intermigrations between the two floras undoubtedly took place at approximately the same time. The majority of the Australasian types mentioned above as occurring on Mount Pulog belong in the second category, that is, to groups that have reached their greatest development in the north temperate zone, but *Microlaena, Schoenus, Uncinia, Drimys, Leptospermum,* and *Halorrhagis,* manifestly must be referred to the second category. In other parts of the Philippines we have other representatives of these strictly Australian types, such as *Centrolepis philippinensis* Merr., *Thysanotus chinensis* Benth., *Ascarina philippinensis* C. B. Rob., *Patersonia lowii* Stapf, *Phrygilanthus obtusifolius* Merr., *Acacia confusa* Merr., *Stackhousia intermedia* Bailey, *Pimelea* sp. nov., *Didiscus saniculaefolius* Merr., *Leucopogon suaveolens* Hook. f., *Calogyne pilosa* R. Br., *Stylidium alsinoides* R. Br., and *Eucalyptus naudiniana* F. Muell.

Somewhat over 100 species are more or less widely distributed in the Indo-Malayan region, and generally also of wide distribution in the Philippines. Evidences of special alliances between the flora of Mount Pulog and that of other parts of Malaya are slight. So far as our collections and observations show, such characteristic families as *Palmae, Pandanaceae,* and *Dipterocarpaceae* are unrepresented on Mount Pulog, yet all of these are strongly developed as regards species in other parts of the Philippines and throughout Malaya in general; scores of charac-

teristic Malayan genera which are represented in other parts of the Philippines with from one to many species have not been found on Mount Pulog.

The material on which the present paper is based was for the most part collected by Messrs. H. M. Curran, M. L. Merritt, and T. C. Zschokke, of the Bureau of Forestry, in January, 1909, supplemented by smaller collections made by Mr. E. D. Merrill and Dr. E. B. Copeland in May, 1909, and by those made by Mr. R. C. McGregor in July, 1909. No previous botanical collections were ever made on the mountain.

In the following enumeration the mosses have been identified by Dr. V. F. Brotherus, of Helsingfors, Finland; the scale-mosses by Herr F. Stephani, Leipzig, Germany; the pteridophyta by Dr. E. B. Copeland, Los Baños, Luzon; *Carex* and *Uncinia* by Rev. G. Kükenthal, Coburg, Germany; *Orchidaceae* by Mr. Oakes Ames, North Easton, Massachusetts, U. S. A. Some of the *Gramineae* have been examined by Dr. E. Hackel, Attersee, Austria, and Dr. C. B. Robinson, of this office, has identified the *Myrtaceae,* some of the *Euphorbiaceae,* and the *Urticaceae.* Dr. Warren D. Smith, chief of the division of mines, Bureau of Science, has kindly supplied the data regarding the geology of the Benguet-Lepanto region. To the above gentlemen the authors are under obligations for assistance supplied. Unless otherwise stated in the text, the other identifications are by E. D. Merrill.

Material from Mount Pulog as yet unidentified and hence not considered in this paper comprises rather an extensive collection of lichens, a considerable number of scale-mosses collected by Mr. McGregor, a few mosses, and a small collection of fungi, principally *Polyporaceae.* Many of the data used in the introduction are taken from notes compiled by the Forestry Bureau party, and much of the success of that party was due to the energy and ability displayed by Mr. Curran, to whom great credit is due for the successful termination of the first comprehensive exploration of Mount Pulog.

The photographs used in illustrating this paper were taken by Mr. Merritt, while the authors are under obligations to Major G. P. Ahern, Director of Forestry, for the preparation of the map, which has been compiled from surveys made by Mr. Benson and by Messrs. Curran, Merritt, and Zschokke.

In the following systematic enumeration the material secured by Messrs. Curran, Merritt, and Zschokke, distributed in the Forestry Bureau series, has for brevity been cited as "C. M. Z." The material collected by Mr. McGregor forms a part of the Bureau of Science series.

The systematic enumeration is by E. D. Merrill.

BRYOPHYTA.

HEPATICÆ.

MARCHANTIACEÆ.[6]

MARCHANTIA (L.) Raddi.

1. **M. geminata** Nees.
In the mossy forest, *C. M. Z. 16392.*
India, Java, Sumatra.

JUNGERMANNIACEÆ.[6]

JAMESONIELLA (Spruce) Steph.

1. **J. flexicaulis** Nees.
In the mossy forest, *Merrill 6404, 6421, 6419.*
Java, Borneo.
2. **J. ovifolia** Schiffn.
In the mossy forest, *C. M. Z. 16385.*
Ceylon through Malaya to Fiji and Hawaii.

ANASTROPHYLLUM Steph.

1. **A.** sp. nov. fide Stephani.
Mossy forest above an altitude of 2,250 m, *Merrill 6403.*

PLAGIOCHILA Dum.

1. **P. vittata** Steph. in Bull. Herb. Boiss. II 3 (1903) 596.
In the mossy forest, *Merrill 6406.*
Endemic.

LOPHOCOLEA Dum.

1. **L. hasskarliana** Gott.
In the mossy forest, *C. M. Z. 16384a.*
Java.

CHANDONANTHUS Mitt.

1. **C. fragillimus** Steph.
In the mossy forest or summit grass lands, *C. M. Z. 16389.*
2. **C. hirtellus** Mitt.
In the mossy forest, *Merrill 6401a.*
Tropical Africa and Asia through Malaya and Polynesia.

SCHISMA Nees.

1. **S. sikkimense** Steph.
In the mossy forest, *Merrill 6408, 6415.*
2. **S. wichurae** Steph.
In the mossy forest, *C. M. Z. 16429.*

LEPICOLEA Dum.

1. **L. scolopendra** (Hook.) Dum.
In the mossy forest, *Merrill 6409.*

[6] Identifications by Herr F. Stephani, Leipzig, Germany.

MASTIGOPHORA Nees.

1. **M. diclados** Endl.
In the mossy forest, abundant, *C. M. Z. 16386.*
Tropical Africa and Asia through Malaya to Samoa.

SCHISTOCHILA Dum.

1. **S. sumatrana** Steph.
In the mossy forest, *C. M. Z. 16387, 16384.*
Sumatra.
2. **S.** sp. nov. fide Stephani.
In the mossy forest, *Merrill 6413.*

PLEUROZIA Dum.

1. **P. gigantea** (Web.) Lindb.
In the mossy forest, *C. M. Z. 16388, 16390.*
Tropical Africa, Ceylon, and Malaya.

FRULLANIA Raddi.

1. **F. bilobulata** Steph.
In the mossy forest, *Merrill 6416.*
2. **F. cordistipula** Nees.
In the mossy forest, *Merrill 6407.*
Java, Sumatra, Halmaheira, and Tahiti.
3. **F. explicata** Mont.
In the mossy forest, *Merrill 6405.*
4. **F. ornithocephala** Nees.
In the mossy forest, *Merrill 6412, 6420, 6641.*
Burma, Java, and Amboina.
5. **F. pacifica** Tayl.
In the mossy forest, *C. M. Z. 16430 pp.*
6. **F. philippinensis** Steph.
Mixed with the preceding.
Endemic.
7. **F.** sp. nov. fide Stephani.
In the mossy forest and on dwarfed bamboo (*Arundinaria*), *Merrill 6414, 6418.*

BRACHIOLEJEUNEA Spruce.

1. **B. repleta** Tayl.
Mossy forest above an altitude of 2,250 m, *Merrill 6410.*

MUSCI.[7]

SPHAGNACEÆ.

SPHAGNUM (Dill.) Ehrh.

1. **S. junghuhnianum** Doz. & Molk.
In the mossy forest, altitude about 2,700 m, *C. M. Z. 16421.*
Higher mountains of Luzon; Sikkim and Khasia to Java, Batjan, and Celebes.

[7] Compiled from Brotherus' "Contributions to the Bryological Flora of the Philippines, III," *supra*, 137–162.

DICRANACEÆ.

CERATODON Brid.

1. **C. stenocarpus** Byrol. eur.

In the mossy forest above an altitude of 2,500 m, *C. M. Z. 16408, 16422.*

In the Philippines known only from the Benguet-Lepanto region; Tropics of the world.

BRAUNFELSIA Par.

1. **B. luzonensis** Broth.

In the mossy forest, altitude about 2,600 m, *C. M. Z. 16399.*

Higher mountains of the Benguet-Lepanto region, Abra, and Zambales; endemic.

CAMPYLOPUS Brid.

1. **C. densinervis** Broth.

On earth in ravines, altitude 1,940 to 2,660 m, *C. M. Z. 16407, 16423.*

Known only from Mount Pulog.

PILOPOGON Brid.

1. **P. subexasperatus** (C. Müll.) Broth.

Open grass lands of the summit, altitude about 2,800 m, *C. M. Z. 16428.*

Higher mountains of the Philippines; endemic.

FISSIDENTACEÆ.

FISSIDENS Hedw.

1. **F. pulogensis** Broth.

On trees, mossy forest, *C. M. Z. 16396.*

Known only from Mount Pulog.

ORTHOTRICHACEÆ.

MACROMITRIUM Brid.

1. **M. reinwardtii** Schwaegr.

In the mossy forest, *C. M. Z. 16431, Merrill 6398, 6400.*

Higher mountains of the Philippines; Java and Borneo to Tasmania and Tahiti.

2. **M. sulcatum** (Hook. & Grev.) Brid.

Habitat not given, probably in the mossy forest, *C. M. Z. 16424.*

Higher mountains of the Philippines; India, Ceylon, Malacca, and Borneo.

3. **M. goniostomum** Broth.

In the mossy forest above an altitude of 2,200 m, *Merrill 6401.*

Otherwise known only from Pauai across the Agno River from Mount Pulog.

SCHLOTHEIMIA Brid.

1. **S. wallisii** C. Müll.

In the mossy forest above an altitude of 2,500 m, *C. M. Z. 16397, 16414, 16415, McGregor 8907.*

Higher mountains of Luzon; endemic.

FUNARIACEÆ.

FUNARIA Schreb.

1. **F. calvescens** Schwaegr.
Habitat not given, probably in the pine region, *McGregor 8911*.
Widely distributed in the Philippines; temperate and tropical regions of the world.

BRYACEÆ.

BRACHYMENIUM Schwaegr.

1. **B. nepalense** Hook.
Habitat not given, *C. M. Z. 16432*.
Mountains of Luzon; India to Sumatra, Java, and Borneo.

ANOMOBRYUM Schimp.

1. **A. uncinifolium** Broth.
In the pine region, altitude about 1,900 m, *C. M. Z. 16417*.
Known only from Mount Pulog.

BRYUM Dill.

1. **B. ramosum** (Hook.) Mitt.
Habitat not given, *C. M. Z. 16398*.
Mountains of India, Ceylon, Java, and Formosa.

MNIACEÆ.

MNIUM (Dill.) Linn.

1. **M. rostratum** Schrad.
In the mossy forest, altitude about 2,660 m, *C. M. Z. 16402*.
Temperate and tropical regions of the World.

RHIZOGONIACEÆ.

HYMENODON Hook. f. & Wils.

1. **H. sericeus** (D. &. M.) C. Müll.
In the mossy forest, *C. M. Z. 16404*.
Java, Borneo.

BARTRAMIACEÆ.

LEIOMELA (Mitt.) Broth.

1. **L. javanica** (Ren. & Card.) Broth.
In the mossy forest above an altitude of 2,250 m, *McGregor 8909*.
Java.

BREUTELIA Schimp.

1. **B. merrillii** Broth.
In the pine region, *C. M. Z. 16406*.
Known only from the Benguet-Lepanto region.

POLYTRICHACEÆ.

POGONATUM Palis.

1. **P. microstomum** R. Br.
In the pine region, altitude about 1,900 m, *C. M. Z. 16411, McGregor 8908.*
In the Philippines known only from the Benguet-Lepanto region; Himalayan region to Ceylon and Yunnan.

2. **P. spurio-cirratum** Broth.
In the mossy forest, *C. M. Z. 16393, 16412, Merrill 6396.*
Known only from the mountains of Luzon.

CRYPHAEACEÆ.

PILOTRICHOPSIS Besch.

1. **P. dentata** (Mitt.) Besch.
In the mossy forest, *McGregor 8906.*
Japan and Formosa.

NECKERACEÆ.

TRACHYLOMA Brid.

1. **T. tahitense** Besch.
In the mossy forest, *C. M. Z. 16427.*
Ceylon, Java, and Tahiti.

ENDOTRICHELLA C. Müll.

1. **E. elegans** (D. & M.) C. Müll.
In the mossy forest, *McGregor 8905.*
Mountains of the Philippines; Burma to Java, Sumatra, and Celebes.

METEORIUM D. & M.

1. **M. miquelianum** (C. Müll.) Fleisch.
In the mossy forest, *McGregor 8910.*
Ceylon through Malaya to New Guinea; also in Japan.
2. **M. helminthocladum** (C. Müll.) Fleisch.
In the mossy forest, *Merrill 6397.*
China, Japan, and Formosa.

FLORIBUNDARIA C. Müll.

1. **F. floribunda** (D. & M.) Fleisch.
In the mossy forest, *C. M. Z. 16419.*
Tropical Asia to New Guinea and Polynesia.

CHRYSOCLADIUM Fleisch.

1. **C. rufifolioides** Broth.
In the mossy forest, *McGregor 8914.*
Known only from Mount Pulog.

CALYPTOTHECIUM Mitt.

1. **C. macgregorii** Broth.
In the mossy forest, *McGregor 8913.*
Known only from Mount Pulog.

ENTODONTACEÆ.

CLASTOBRYUM D. & M.

1. **C. robustum** Broth.
In the mossy forest, *McGregor 8912.*
Known only from Mount Pulog.

FABRONIACEÆ.

MERRILLIOBRYUM Broth.

1. **M. philippinense** Broth.
In the mossy forest, *C. M. Z. 16432 pp.*
Known only from the Benguet-Lepanto region.

HOOKERIACEÆ.

DALTONIA Hook. & Tayl.

1. **D. revoluta** Broth.
In the mossy forest, *C. M. Z. 16405.*
Known only from Mount Pulog.

LESKEACEÆ.

THUIDIUM Bryol. eur.

1. **T. casuarinum** (C. Müll.) Jaeg.
In the mossy forest, altitude about 2,600 m, *C. M. Z. 16403.*
Mountains of Luzon; endemic.

HYPNACEÆ.

LEPTOHYMENIUM Schwaegr.

1. **L. tenue** (Hook.) Schwaegr.
In the upper pine region, or lower parts of the mossy forest, *C. M. Z. 16425, 16426.*
Himalayan region, the Khasia Mountains, and Burma.

PLAGIOTHECIUM Bryol. eur.

1. **P. neckeroideum** Bryol. eur.
In the mossy forest, altitude about 2,600 m, *C. M. Z. 16382.*
Switzerland, Austria, Himalayan region, and Japan.

PTERIDOPHYTA.[8]

HYMENOPHYLLACEÆ.

TRICHOMANES Linn.

1. **T.** sp.
In the mossy forest, altitude about 2,600 m, *C. M. Z. 16318.* "New, at least to the Philippines" Copeland.

[8] Identifications by Dr. E. B. Copeland, College of Agriculture, Los Baños, Province of Laguna, Luzon.

HYMENOPHYLLUM Sm.

1. **H. australe** Willd. Sp. Pl. **5** (1810) 527.

In the mossy forest, altitude about 2,600 m, *C. M. Z. 16317, Copeland.*

Widely distributed on the mountains of the Philippines; India through Malaya to Australia, and Polynesia.

2. **H. discosum** Christ in Bull. Herb. Boiss. **6** (1898) 140.

Widely distributed in the mossy forest above an altitude of 2,500 m, *Merrill 6386, 6374, Copeland.*

Known only from the mountains of the Philippines.

3. **H. paniculiflorum** Presl Hymen. (1843) 32, 55.

In the mossy forest, altitude about 2,500 m, *Merrill 6373, C. M. Z. 16316, Copeland.*

Widely distributed in the Philippines; Malaya.

CYATHEACEÆ.

BALANTIUM Kaulf.

1. **B. copelandi** Christ ex Copel. in Philip. Journ. Sci. **3** (1908) Bot. 301.

On steep pine slopes, altitude about 1,600 m, *C. M. Z. 16260.*

Mountains of Luzon and Negros; endemic.

CYATHEA Sm.

1. **C. contaminans** (Wall.) Copel. in Philip. Journ. Sci. **4** (1909) Bot. 60.

In the mossy forest and upper pine region, *C. M. Z. 16320, 18136.*

Widely distributed at medium and higher altitudes in the Philippines; India to Malaya.

2. **C. fuliginosa** (Christ) Copel. l. c. 43.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 18041, Merrill 6385.*

Known only from similar habitats in the Benguet-Lepanto region.

POLYPODIACEÆ.

DIACALPE Bl.

1. **D. aspidioides** Bl. Enum. Pl. Jav. (1828) 241.

In the upper pine region and in the mossy forest, *Merrill 6384, McGregor 8898.*

Higher mountains of northern and central Luzon; India to Malaya.

PERANEMA Don.

1. **P. luzonica** Copel. in Philip. Journ. Sci. 4 (1909) Bot. 111.

In the upper parts of the mossy forest and on outcroppings of ledges in the summit grass lands, *C. M. Z. 16280, Merrill 6367, Copeland 2307.*

Known only from Mount Pulog, the only other known species of the genus, *P. cyatheoides* Don, confined to India and western China.

DRYOPTERIS Adans.

1. **D. beddomei** (Baker) O. Ktze. Rev. Gen. Pl. **2** (1891) 812; Christ in Philip. Journ. Sci. **2** (1907) Bot. 208.

Abundant in the upper pine region ascending to an altitude of about 2,000 m, *C. M. Z. 16249.*

Known in the Philippines only from the Benguet-Lepanto region; India to southern China and Malaya.

2. **D. brunnea** (Wall.) C. Chr. Ind. Fil. (1905) 255; Christ l. c. 214.

In the mossy forest and also in ravines in the summit grass lands, ascending to an altitude of 2,700 m, *C. M. Z. 16279*, identification after Christ.

Known in the Philippines only from the Benguet-Lepanto region; India to China, Japan, and Malaya.

3. **D. cucullata** (Bl.) Christ in Philip. Journ. Sci. **2** (1907) Bot. 194.

Habitat and altitude not given, probably in the lower pine region, *C. M. Z. 16244*.

Widely distributed in the Philippines at low and medium altitudes; Malaya to the Seychelles.

4. **D. filix mas** (L.) Schott var. **parallelogramma** (Kuntze) Christ in Philip. Journ. Sci. **2** (1907) Bot. 212.

In the mossy forest ascending to at least 2,500 m, *C. M. Z. 16247, Copeland.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; widely distributed in tropical and temperate regions.

5. **D. gracilescens** (Bl.) O. Ktze. Rev. Gen. Pl. **2** (1891) 812.

In the mossy forest, altitude about 2,500 m, *C. M. Z. 16248.*

In the Philippines known only from Benguet; Japan to China, northern India, and Java.

6. **D. heleopteroides** Christ in Philip. Journ. Sci. **2** (1907) Bot. 212.

On rocks in stream depressions, altitude about 1,500 m, *C. M. Z. 16250.*

Known only from Benguet Province, Luzon.

7. **D. hirtipes** (Bl.) O. Ktze. Rev. Gen. Pl. **2** (1891) 813.

In the mossy forest, altitude about 2,500 m, *C. M. Z. 16278.*

Known in the Philippines only from the Benguet-Lepanto region; northern India to China, Malaya, and Polynesia.

8. **D. luerssenii** (Harr.) C. Chr. Ind. Fil. (1905) 276.

Habitat and altitude not given, probably stream depressions in the pine region, *C. M. Z. 16252*, and a more dwarfed form, altitude about 1,500 m, *C. M. Z. 16251*, which is probably referable here.

Widely distributed in the Philippines; endemic.

9. **D. setigera** (Bl.) O. Ktze. Rev. Gen. Pl. **2** (1891) 813; Christ in Philip. Journ. Sci. **2** (1907) Bot. 215.

In the pine region, altitude about 1,500 m, *C. M. Z. 16309, 16253*, representing two forms that future study may determine to be specifically distinct.

Widely distributed in the Philippines at low and medium altitudes; India to Japan, south through Malaya to Australia and Polynesia.

In addition to the above nine species of this genus, four additional ones, at present unidentified, are represented by the following specimens: *C. M. Z. 16245, 16246*, both from an altitude of about 1,800 m, *Copeland s. n.*, from the mossy forest at an altitude of about 2,750 m, probably representing an undescribed form, and *C. M. Z. 16277* from the mossy forest, a form of the *D. dissecta* group.

POLYSTICHUM Roth.

1. **P. aculeatum** (L.) Schott Gen. Fil. (1834) *t. 9.*

In the mossy forest, altitude above 2,400 m, *C. M. Z. 16254, Merrill 6372, 8813.*

Widely distributed on the higher mountains of the Philippines; temperate and tropical regions of the world. The forms here enumerated apparently represent two undescribed varieties.

2. **P. amabile** (Bl.) J. Sm. Ferns Brit. & For. (1866) 152.

In the mossy forest, altitude about 2,400 m, *C. M. Z. 16256.*

Widely distributed on the higher mountains of the Philippines; India to China, and Malaya.

3. **P. auriculatum** (L.) Presl Tent. (1836) 83.

In the mossy forest and on outcroppings of ledges in the summit grass lands, *C. M. Z. 16257, Merrill 6366, Copeland 2306.*

Known in the Philippines only from the Benguet-Lepanto region; India to Formosa.

A fourth species is possibly represented by *C. M. Z. 16255* from the mossy forest, altitude about 2,500 m.

NEPHROLEPIS Schott.

1. **N. cordifolia** (L.) Presl Tent. (1836) 79.

In ravines, upper pine region, ascending to an altitude of about 2,000 m, *C. M. Z. 16265.*

Widely distributed in the Philippines at medium and higher altitudes; tropical Asia and Japan to New Zealand.

HUMATA Cav.

1. **H.** sp. (=*Copeland 1863* from Mount Data, Luzon).

Epiphytic in the mossy forest, altitude about 2,500 m, *C. M. Z. 16263.*

Probably an undescribed form.

PROSAPTIA Presl.

1. **P. linearis** Copel. in Philip. Journ. Sci. 4 (1909) Bot. 115.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16303, Merrill 6377, Copeland.*

Known only from Mount Pulog.

DAVALLIA Sm.

1. **D. denticulata** (Burm.) Mett.; Kuhn Fil. Deck. (1867) 27.

On boulders and cliffs in stream depressions, pine region, altitude about 1,500 m, *Merrill 6359.*

Widely distributed in the Philippines at low and medium altitudes; tropical Asia and Africa to Malaya, Australia, and Polynesia.

MICROLEPIA Presl.

1. **M. strigosa** (Thunb.) Presl Epim. (1851) 95.

In the mossy forest, altitude about 2,300 m, *C. M. Z. 16262.*

Widely distributed in the Philippines at medium and higher altitudes; tropical Asia to Japan, and Polynesia.

ODONTOSORIA Fée.

1. **O. chinensis** (L.) J. Sm. Bot. Voy. Herald (1857) 430.

On steep slopes in the pine region, altitude below 1,700 m, *C. M. Z. 16259.*

Widely distributed in the Philippines at medium altitudes; tropical Asia to Madagascar, Japan, Malaya, and Polynesia.

DENNSTAEDTIA Bernh.

1. **D. scabra** (Wall.) Moore Ind. (1861) 307.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16261, Merrill 6375.*

Higher mountains of the Philippines; India to China.

LINDSAYA Dry.

1. **L. cultrata** (Willd.) Sw. Syn. (1806) 119.

On outcroppings of ledges in the summit grass lands, altitude about 2,800 m, *C. M. Z. 16258.*

Widely distributed in the Philippines at medium and higher altitudes; tropical Asia to Madagascar, Malaya, and Queensland.

ATHYRIUM Roth.

1. **A. anisopterum** Christ in Bull. Herb. Boiss. **6** (1898) 962.

In the mossy forest, altitude about 2,500 m, *C. M. Z. 16275.*

In the Philippines known only from the higher mountains of northern and central Luzon; southern China.

2. **A. aristulatum** Copel. in Philip. Journ. Sci. 1 (1906) Suppl. 253.

In the mossy forest, ascending to an altitude of about 2,500 m, *C. M. Z. 16272, Merrill 6380, Copeland 2303.* A possibly distinct form is represented by *C. M. Z. 16273* and *Merrill 6381* from the upper limits of the mossy forest.

Known only from the Benguet-Lepanto region.

3. **A. drepanopteron** (Kze.) A. Br.; Milde Fil. Eur. (1867) 49.

Altitude and habitat not given, *C. M. Z. 16271.*

Known in the Philippines only from the Benguet-Lepanto region; Japan to northern India.

4. **A. macrocarpum** (Bl.) Bedd. Ferns S. Ind. (1863) *t. 152, 153.*

In the mossy forest, altitude about 2,500 m, *C. M. Z. 16276.*

Mountains of Luzon and Mindoro; Japan to India, and Malaya.

5. **A. nigripes** Bl. var. **mearnsianum** Copel. in Philip. Journ. Sci. **3** (1908) Bot. 291.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16274, Copeland 2305.*

The variety known only from similar habits in the Benguet-Lepanto region, the species extending from China to Madagascar.

6. **A. platyphyllum** Copel. l. c. 292.

In the mossy forest above an altitude of 2,300 m, *Merrill 6363, Copeland 2304.*

Known only from similar habitats in the Benguet-Lepanto region.

CURRANIA Copel.

1. **C. gracilipes** Copel. in Philip. Journ. Sci. 4 (1909) Bot. 112.

In crevices of rock outcroppings in the summit grass lands, altitude about 2,850 m, *C. M. Z. 16302, Copeland.*

A monotypic genus known from Mount Pulog, from across the Agno River near Pauai, and from Mount Tonglon (Santo Tomas) where it has also been discovered by Doctor Copeland.

ASPLENIUM Linn.

1. **A. contiguum** Kaulf. Enum. (1824) 172?

In the pine region, altitude about 2,000 m, *C. M. Z. 16268, McGregor 8874.*

This form, which has been identified by various authors as *A. contiguum* Kaulf., is widely distributed in the Philippines. It is doubtful if Kaulfuss' species really extends to the Archipelago; it is otherwise reported from Hawaii.

2. **A. elmeri** Christ in Philip. Journ. Sci. 2 (1907) Bot. 164.

In the mossy forest ascending to about 2,500 m, *C. M. Z. 16269, 16270, Merrill 6378, McGregor 8867.* A form, possibly representing a distinct species is represented by *Merrill 6379.*

3. **A. lepturus** J. Sm. in Hook. Journ. Bot. **3** (1841) 408.
In the mossy forest above an altitude of 2,300 m, *Merrill 6382.*
Widely distributed at higher altitudes in the Philippines; endemic.
4. **A. loherianum** Christ in Bull. Herb. Boiss. **6** (1898) 152.
On rocks in stream depressions, altitude below 1,500 m, *C. M. Z. 16450.*
Known only from the Benguet-Lepanto region.
5. **A. stantoni** Copel. in Philip. Journ. Sci. **1** (1906) Suppl. 151.
In the upper pine region, altitude about 2,000 m, and again on outcroppings of ledges in the summit grass lands, altitude above 2,800 m, *C. M. Z. 16267.*
Known only from the Benguet-Lepanto region.
6. **A.** sp.
On wet cliffs, stream depression, altitude about 1,500 m, *Merrill 6361.*

BLECHNUM Linn.

1. **B. fraseri** (Cunn.) Luerss. var. **philippinense** (Christ) Copel. in Philip. Journ. Sci. **2** (1907) Bot. 130.
In the mossy forest, altitude about 2,700 m, *C. M. Z. 18057.*
The species in New Zealand, the variety on the higher mountains of Luzon, Mindoro, and Negros.

WOODWARDIA Sm.

1. **W. radicans** (L.) Sm. in Mém. Ac. Turin **5** (1793) 412.
In stream depressions, pine region, altitude about 1,500 m, *C. M. Z. 16266.*
In the Philippines known only from the Benguet-Lepanto region and the Batanes Islands; Mediterranean region to China, Japan, and Java.

CHEILANTHES Sw.

1. **C. farinosa** (Forsk.) Kaulf. Enum. (1824) 212.
On steep slopes in the pine region, altitude about 2,000 m, *C. M. Z. 16311.*
Abundant and widely distributed in the Benguet-Lepanto region, and also on Mount Mariveles, Luzon; India to China, Japan, Africa, tropical America, and the Fiji Islands.

HYPOLEPIS Bernh.

1. **H. tenuifolia** (Forst.) Bernh. in Schrad. Neu Journ. 1^2 (1806) 34.
In the mossy forest, altitude about 2,400 m, *C. M. Z. 16310.*
Not common in the Philippines; India to China, Malaya, Polynesia, and New Zealand.

PLAGIOGYRIA Mett.

1. **P. nana** Copel. in Philip. Journ. Sci. **4** (1909) Bot. 114.
At the base of cliffs in the summit grass lands, altitude about 2,850 m, and also in the upper limits of the mossy forest, *C. M. Z. 16306, Merrill 6365, Copeland 2302.*
Known only from Mount Pulog.
2. **P. pycnophylla** (Kze.) Mett. Plagiog. (1858) 8, no. 2.
On ledges in the summit grass lands, altitude about 2,800 m, *C. M. Z. 16307.*
Higher mountains of central and northern Luzon; India to Java and Borneo.

ADIANTUM Linn.

1. **A. edgeworthii** Hook. Sp. **2** (1851) 14.
On steep slopes, upper pine region, altitude about 1,900 m, *C. M. Z. 16308.*
In the Philippines known only from the Benguet-Lepanto region; China and India.

PTERIS Linn.

1. **P. cretica** Linn. Mant. (1767) 130.

In the mossy forest, altitude above 2,300 m, *C. M. Z. 16305.*

Very widely distributed in the Philippines; widely distributed in the tropical and subtemperate parts of the world.

2. **P. quadriaurita** Retz. Obs. **6** (1791) 38.

In the pine region, altitude about 1,600 m, *C. M. Z. 16304, Merrill 6358,* and in the mossy forest, *Merrill 6371, McGregor 8817,* two forms being represented, that from the pine region simply pinnate, that from the mossy forest somewhat bipinnate.

HISTIOPTERIS J. Sm.

1. **H. incisa** (Thunb.) J. Sm. Hist. Fil. (1875) 295.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16312.*

Widely distributed in the Philippines at medium and higher altitudes; tropical and subtropical regions of the world.

PTERIDIUM Gledit.

1. **P. aquilinum** (Linn.) Kuhn Deck. Reisen 3^3 (1879) Bot. 11.

Very abundant and widely distributed in the pine region, altitude from 1,400 to 2,000 m, *C. M. Z. 16314, Merrill 6357, McGregor 8818.*

Widely distributed in the Philippines, more frequently at medium altitudes, sometimes at sea level; tropical and temperate regions of the world.

PAESIA St. Hil.

1. **P. luzonica** Christ in Philip. Journ. Sci. **3** (1908) 275.

In the upper limits of the mossy forest, altitude about 2,700 m, *C. M. Z. 16313.*

Known only from the higher mountains of northern and central Luzon; allied to *P. rugulosa* Kuhn of New Caledonia and Tahiti.

PLEUROGRAMME Presl.

1. **P. loheriana** Christ in Bull. Herb. Boiss. II **6** (1906) 1006.

In the mossy forest above an altitude of 2,300 m, *McGregor 8851.*

Widely distributed on the higher mountains of the Philippines; endemic.

HYMENOLEPIS Kaulf.

1. **H. platyrhynchos** (J. Sm.) Kze. Farnkr. 1 (1842) 101.

Abundant in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16290, Merrill 6387.*

Widely distributed on the higher mountains of the Philippines; Celebes, Borneo.

2. **H. spicata** (L. f.) Presl Epim. (1851) 159.

Very abundant, and with the same habitat and range in the Philippines as the preceding, *C. M. Z. 16291, 16292, Merrill 6355, McGregor 8819, 8845.*

Tropical Asia to Madagascar, Malaya, and Polynesia.

POLYPODIUM Linn.

1. **P. albidosquamatum** Bl. Enum. (1828) 132. § *Pleopeltis.*

In ravines, pine region, altitude about 2,000 m, *C. M. Z. 16286.*

Widely distributed in the Philippines at higher altitudes; throughout Malaya.

2. **P. argutum** Wall. Cat. (1828) no. 308; Hook. Sp. **5** (1863) 32. § *Goniophlebium.*

Abundant in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16288, Merrill 6369, Copeland.*

Known in the Philippines only from the Benguet-Lepanto region; Himalayan region and southern China.

3. **P. benguetense** Copel. in Philip. Journ. Sci. **1** (1906) Suppl. 256. § *Goniophlebium.*

In stream depressions, lower pine region, altitude below 1,500 m, *C. M. Z. 16287.*

Known only from the Benguet-Lepanto region.

4. **P. caespitosum** (Bl.) Mett. in Ann. Mus. Ludg.-Bat. **2** (1866) 219. § *Grammitis.*

In the mossy forest, epiphytic, altitude above 2,300 m, *C. M. Z. 16299, Merrill 6388, Copeland Pter. Phil. Exsic. 135.*

Widely distributed on the higher mountains of the Philippines; Java.

5. **P. congenerum** (Bl.) Presl Tent. (1836) 180. § *Grammitis.*

Abundant in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16297, 16298, Merrill 6376, McGregor 8882, Copeland Pter. Phil. Exsic. 136.*

Widely distributed in the Philippines at higher altitudes; Malaya.

6. **P. elmeri** Copel. in Perk. Frag. Fl. Philip. (1905) 191. § *Selliguea.*

On steep dry slopes in the pine region, ascending to an altitude of about 2,000 m, *C. M. Z. 16283, Copeland.*

Known only from the Benguet-Lepanto region.

7. **P. fasciculatum** (Bl.) Presl Tent. (1836) 180. § *Grammitis.*

Widely distributed in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16295, Copeland.*

Widely distributed in the Philippines at higher altitudes; Malaya.

8. **P. gracillimum** Copel. in Perk. Frag. Fl. Philip. (1905) 189. § *Eupolypodium.*

In the mossy forest above an altitude of 2,300 m, *McGregor 8869, Copeland.*

Widely distributed in the Philippines on the higher mountains; endemic.

9. **P. hirtellum** Bl. Enum. (1828) 122. § *Grammitis.*

In the mossy forest, *C. M. Z. 16296.*

Widely distributed on the higher mountains of the Philippines; southern China through Malaya to New Caledonia.

10. **P. mollicomum** Nees & Bl. in Nova Acta Acad. Nat. Cur. **11** (1823) 121, *t. 12, f. 2.* § *Eupolypodium.*

In the mossy forest, *C. M. Z. 16264.*

Widely distributed on the higher mountains of the Philippines; Java, Celebes.

11. **P. palmatum** Bl. Enum. (1828) 131. § *Pleopeltis.*

Abundant in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16285, McGregor 8878, Merrill 6362, 6370, Copeland.*

At medium and higher altitudes throughout the Philippines; widely distributed in Malaya.

12. **P. subevenosum** Bak. Syn. (1867) 320. § *Grammitis.*

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16294, 16300, Copeland 2311.*

At higher altitudes in the Philippines; Malay Peninsula to Celebes.

13. **P. subauriculatum** Bl. Enum. (1828) 133. § *Goniophlebium.*

In stream depressions, pine region, below an altitude of 1,500 m, *Copeland.*

Widely distributed in the Philippines at low and medium altitudes; India through Malaya to Samoa.

14. **P. obtusissimum** C. Chr. Ind. Fil. (1905) 549. § *Eupolypodium.*

In the mossy forest above an altitude of 2,300 m, *McGregor 8883, Copeland 2310.*

Mountains of the Philippines; endemic.

15. **P. subpinnatifidum** Bl. Enum. (1828) 129. § *Eupolypodium.*
In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16293, Copeland.*
Mountains of the Philippines; Malay Peninsula and Java.
16. **P. venulosum** Bl. Enum. (1828) 128. § *Eupolypodium.*
In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16301, Merrill 6353.*
Widely distributed on the higher mountains of the Philippines; Malaya.
17. **P.** sp.
In the mossy forest above an altitude of 2,300 m, *Merrill 6383, Copeland Pter. Phil. Exsic. 130.*
Apparently an undescribed species.

LOXOGRAMME Presl.

1. **L. parallela** Copel. in Perk. Frag. Fl. Philip. (1905) 182.
Abundant in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16289, Merrill 6368, McGregor 8881, Copeland.*
Known only from the higher mountains of the Benguet-Lepanto region.

CYCLOPHORUS Desv.

1. **C. sticticus** (Kze.) C. Chr. Ind. Fil. (1905) 201.
On boulders in stream depression, pine region, altitude about 1,500 m, *C. M. Z. 16284, Merrill 6360.*
Known in the Philippines only from the Benguet-Lepanto region; India and Ceylon to China.

PHOTINOPTERIS J. Sm.

1. **P. speciosa** Bl.; Presl Epim. (1851) 264.
On steep slopes in the pine region, altitude about 1,500 m, *C. M. Z. 16281.*
Found at medium altitudes, Luzon to Mindanao; Malaya.

DRYNARIA J. Sm.

1. **D. rigidula** (Sw.) Bedd. Ferns Brit. Ind. (1869) *t. 314.*
Abundant on steep dry slopes in the pine region, *C. M. Z. 16282, Merrill 6356.*
Widely distributed in the Philippines at medium altitudes; tropical Asia to Polynesia and Australia.

ELAPHOGLOSSUM Schott.

1. **E. laurifolium** (Thouars) Moore Ind. (1857) XVI.
In the mossy forest above an altitude of 2,300 m, *McGregor 8850, Copeland.*
In the Philippines known only from the Benguet-Lepanto region; India to the Mascarene Islands and Malaya.

GLEICHENIACEÆ.

GLEICHENIA Sm.

1. **G. loheri** Christ in Bull. Herb. Boiss. II 6 (1906) 1009.
Upper parts of the mossy forest, especially in thickets along the upper border, *C. M. Z. 16319, Merrill 6364, Copeland 2300.*
Known only from the higher mountains of northern and central Luzon.
2. **G.** sp.
In the mossy forest, altitude about 2,800 m, *Copeland.*
Probably an undescribed form, allied to *G. laevissima* Christ.

EQUISETACEÆ.

EQUISETUM Linn.

1. **E. ramosissimum** Desf. Fl. Atl. 2 (1800) 398.

Stream depressions in lower pine region, *C. M. Z. 16321, Merrill 6390.*

Widely distributed in the Philippines; cosmopolitan in warm temperate and tropical regions of the world.

LYCOPODIACEÆ.

LYCOPODIUM Linn.

1. **L. carinatum** Desv. in Lam. Encycl. Suppl. 3: 599.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16322, McGregor 8836, Copeland 2301.*

Widely distributed on the mountains of the Philippines; India to Formosa, Malaya, and Polynesia.

2. **L. complanatum** L. Sp. Pl. ed. 2 (1763) 1567.

In the mossy forest, altitude about 2,700 m, *C. M. Z. 16324.*

Known in the Philippines only from the Benguet-Lepanto region, the Philippine material being referable to the var. *thuyoides* H. B. K.

North temperate zone of both hemispheres, southward through Malaya to New Guinea.

3. **L. volubile** Forst. Prodr. (1786) 86.

In the mossy forest above an altitude of 2,300 m, *Merrill 6392.*

Higher mountains throughout the Philippines; New Zealand, Polynesia, New Caledonia, northern Australia, and the mountains of the Malay Archipelago and Peninsula.

SELAGINELLACEÆ.

SELAGINELLA Linn.

Two species of this genus are represented in the collections, the first, *Merrill 6389*, from boulders in stream depressions, altitude about 1,500 m, and the second from the mossy forest, above an altitude of 2,300 m, *McGregor 8877, Merrill 6391.*

GYMNOSPERMÆ.

TAXACEÆ.

TAXUS Linn.

1. **T. baccata** Linn., subsp. **wallichiana** (Zucc.) Pilg. in Engl. Pflanzenreich 18 (1903) 112.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 18106.*

In the Philippines known only from high altitudes in the Benguet-Lepanto region, and from Mount Banajao, Luzon; Himalayan region to Burma, Sumatra (?), and Celebes, the species very widely distributed in the north temperate zone.

PODOCARPUS L'Hérit.

1. **P. imbricatus** Bl. var. **cumingii** (Parl.) Pilg. l. c. 56.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 18049.* Locally known as *igum.*

Widely distributed on the higher mountains of the Philippines from northern Luzon to southern Mindanao, the species in Java, Sumatra, Borneo, Celebes, Burma, and Hainan.

PINACEÆ.

PINUS L.

1. **P. insularis** Endl. Syn. Conif. (1847) 157.

Abundant and widely distributed in the Benguet-Lepanto region, and the most characteristic tree of the entire area; common and forming thin forests on the steep slopes, altitude 1,200 to 2,200 m on Mount Pulog, *C. M. Z. 18186, 18202,* absent or very rare in the mossy forest but occurring again on the open, grass-covered summit, altitude about 2,800 m, but here very scattered, *C. M. Z. 18065, McGregor 8899.* It is found also on the mountains of Zambales Province, Luzon.

Endemic, but manifestly closely allied to *Pinus khasya* Royle, of Khasia, Chittagong, and Burma.

ANGIOSPERMÆ.

GRAMINEÆ.

COIX Linn.

1. **C. lacryma-jobi** Linn. Sp. Pl. (1753) 972.

In stream depressions, pine region, altitude about 1,400 m, *C. M. Z. 16153.*

Widely distributed in the Philippines at low and medium altitudes, especially in populated districts; warmer parts of the world.

IMPERATA Cyr.

1. **I. cylindrica** (L.) Beauv. var. **koenigii** (Retz.) Benth. ex Pilger in Perk. Frag. Fl. Philip. (1904) 137.

In the pine region, altitude about 1,400 m, *C. M. Z. 16186, 16205.*

Common and widely distributed in the Philippines at low, medium, and occasional at high altitudes; Tropics of the world (species), the variety in tropical Africa and Asia to Polynesia.

MISCANTHUS Anders.

1. **M. sinensis** Anders. Oefv. Vet. Akad. Forhandl. Stockh. (1855) 166.

In the pine region, altitude about 1,200 m, *C. M. Z. 16128,* a form with a very lax panicle, and in the open grass lands of the summit above the mossy forest, *C. M. Z. 16152, McGregor 8838, Merrill 6613,* depauperate forms, with short, dense panicles. Ig., *biidu.*

Widely distributed at medium and high altitudes in the Philippines, very abundant in the Benguet-Lepanto region; Japan and China to Tonkin, Borneo and Celebes.

SACCHARUM Linn.

1. **S. spontaneum** Linn. Mant. (1771) 183, subsp. **indicum** Hack. in DC. Monog. Phan. **6** (1889) 113.

Stream depressions in the lower pine region, *C. M. Z. 16190.*

Abundant and widely distributed in the Philippines at low and medium altitudes; India to southern China, Malaya, Australia, and Polynesia.

POLLINIA Trin.

1. **P. quadrinervis** Hack. in DC. Monog. Phan. **6** (1889) 158.

Stream depressions and on steep slopes in the pine region, *C. M. Z. 16183, 16208, Merrill 6519.*

Known in the Philippines only from the Benguet-Lepanto region; northern India to southern China and the Riu Kiu Archipelago.

ROTTBOELLIA L. f.

1. **R. ophiuroides** (R. Br.) Benth. Fl. Austral. 7 (1878) 514.

On steep, grass-covered slopes in the pine region, *C. M. Z. 16184, 16213.* Ig., *catalon.*

Not widely distributed in the Philippines, chiefly known from the Benguet-Lepanto region; New Guinea and tropical and subtropical Australia.

ANTHRAXON Beauv.

1. **A. ciliaris** Beauv. Agrost. (1812) 111, *t. 11, f. 6,* subsp. **quartinianus** (A. Rich.) Hack. in DC. Monog. Phan. **6** (1889) 365.

Upper pine region, extending to the lower border of the mossy forest, *Merrill 6514.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; mountains of India.

2. **A. microphyllus** (Trin.) Hochst. in Flora **39** (1856) 189.

Upper pine region, *C. M. Z. 16157.*

Known in the Philippines only from the Benguet-Lepanto region; mountains of India to Ceylon and Tonkin.

THEMEDA Forsk.

1. **T. triandra** Forsk. Fl. Aeg.-Arab. (1775) 178.

The most common grass in the entire district, abundant on open slopes in the pine region, *C. M. Z. 18154.*

Common and widely distributed in the Philippines, from sea level to medium and higher altitudes in the open country; widely distributed in the warmer parts of the Old World.

2. **T. gigantea** (Cav.) Hack. var. **genuina** Hack. in DC. Monog. Phan. **6** (1889) 670.

In stream depressions, pine region, *C. M. Z. 16207.* Ig., *talnag.*

Widely distributed in the Philippines at low and medium altitudes; other varieties extending from India to China, and Malaya.

APLUDA Linn.

1. **A. mutica** Linn. Sp. Pl. (1753) 82.

In the pine region, altitude about 1,500 m, *C. M. Z. 16032.*

Widely distributed in the Philippines at low and medium altitudes; India to China, Malaya, Australia, and Polynesia.

ARUNDINELLA Raddi.

1. **A. setosa** Trin. Diss. **2** (1824) 63.

Widely distributed in the pine region, extending to the lower limits of the mossy forest, *C. M. Z. 16154, 16209, 16212.*

At low, medium, and high altitudes in Luzon; India and Ceylon to China and Formosa.

DIGITARIA Scop.

1. **D. longiflora** (Gmel.) Pers. Syn. **1** (1805) 85.

Upper pine region, *Merrill 6518.*

Widely distributed in the Philippines, from sea level to medium and high altitudes; India to Japan and Malaya.

2. **D. sanguinalis** (Linn.) Scop. Fl. Carn. ed. 2, 1 (1772) 52.

In the pine region, altitude about 1,500 m, *C. M. Z. 16130.*

This is the typical (European) form of the species; exceedingly variable, and distributed throughout the temperate and tropical regions of the world.

ISACHNE R. Br.

1. **I. myosotis** Nees in Hook. Kew Journ. 2 (1850) 98.

In the upper pine region, *Merrill 6538.*

Widely distributed in the Philippines at medium altitudes; endemic.

2. **I. beneckei** Hack. in Oesterr. Bot. Zeitschr. 51 (1901) 459.

In the mossy forest, *C. M. Z. 16181.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; Borneo and Java.

Forma **depauperata** Hack. ex Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 350.

In the upper pine region, *Merrill 6504.*

3. **I. pangerangensis** Z. & M., var. **halconensis** Hack. in Philip. Journ. Sci. 3 (1908) Bot. 167.

In open grass lands of the summit, *C. M. Z. 16182.*

The variety from a similar habitat on Mount Halcon, Mindoro, the species in Java.

4. **I. pauciflora** Hack. in Govt. Lab. Publ. (Philip.) 35 (1905) 80.

In the mossy forest, *C. M. Z. 16185.*

Known only from the Benguet-Lepanto region.

5. **I. magna** (Merr.) Merrill comb. nov.

Isachne beneckei Hack. var. *magna* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 350.

In the mossy forest, *Merrill 6569, McGregor 8870.*

This form I now consider to be of specific rank; it is represented also by the following specimens: District of Lepanto, Mount Data, *Merrill 4541:* Province of Benguet, Pauai, *Bur. Sci. 4248, 4483 Mearns;* Baguio to Ambuklao, *Merrill 4372.* It is characterized by its large size, frequently exceeding 1 m in height, while its panicle is very diffuse, reaching a length of 30 cm, the lower branches frequently 20 cm long. Endemic.

PANICUM Linn.

1. **P. crus-galli** Linn. Sp. Pl. (1753) 56.

In stream depressions, pine region, *C. M. Z. 16129.*

Throughout the Philippines; temperate and tropical regions of the world.

2. **P. palmaefolium** Koen. in Naturforsch. 23 (1788) 208.

In stream depressions, pine region *C. M. Z. 16210.*

Throughout the Philippines at low and medium altitudes; India to tropical Africa, China, Japan, and Malaya.

3. **P. villosum** Lam. Ill. 1 (1791) 173.

In the pine region below an altitude of 1,500 m, *C. M. Z. 16159.*

In the Philippines at medium and high altitudes in northern Luzon, and in Mindanao; India to southern China and Formosa.

SETARIA Beauv.

1. **S. flava** (Nees) Kunth Rev. Gram. 1 (1829) 46.

In the pine region, *Merrill 6520, C. M. Z. 16156.*

Widely distributed in the Philippines at low and medium altitudes, exceedingly variable; Tropics of both hemispheres.

MICROLAENA R. Br.

1. **M. stipoides** (Labill.) R. Br. Prodr. (1810) 210.

In the upper pine region at the lower border of the mossy forest, *Merrill 6570.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; Australia and New Zealand. The only species of the genus known outside of Australia and New Zealand.

ANTHOXANTHUM Linn.

1. **A. luzoniense** Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 178.

In open grass lands of the summit, *C. M. Z. 16188, Merrill 6614, McGregor 8890.*

Known only from high altitudes in the Benguet-Lepanto region.

ARISTIDA Linn.

1. **A. cumingiana** Trin. & Rupr. in Mém. Acad. St. Pétersb. VI **7** (1849) 141.

In the pine region at an altitude of about 1,500 m, *C. M. Z. 16158.*

At low and medium altitudes in central and northern Luzon, not common; northern India to China.

SPOROBOLUS R. Br.

1. **S. indicus** (Linn.) R. Br. Prodr. (1810) 1810.

Habitat not given, probably in the pine region, *C. M. Z. 16206.*

Widely distributed in the Philippines at low and medium altitudes; Tropics of the world. The form enumerated above is apparently the one described by Robert Brown as *S. elongatus.*

AGROSTIS Linn.

1. **A. elmeri** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 7.

In open grass lands of the summit, *McGregor 8832, Merrill 6492,* and in the mossy forest, *Merrill 6483a.*

Widely distributed at high altitudes in the Benguet-Lepanto region, but unknown outside of this area. The species is manifestly allied to *Agrostis perennans* (Walt.) Tuckerman, of the eastern United States, Japan, Korea, and central China. For a full discussion of the latter species and its forms, see Hitchcock "North American Species of Agrostis" 47–50, *pl. 31–33.*[9]

ANISELYTRON Merrill gen. nov.

Spiculae parvae, uniflorae, paniculatae, rhachilla supra glumas inferiores articulata, sub flore obconica, ultra florem in stipitem producta, flore hermaphrodito. Glumae 2 inferiores vacuae, valde inaequales, sub articulatione persistentes; I subobsoleta, hyalina, truncata, vix 0.10 mm longa; II lanceolata, acuminata, uninervia, quam tertia dimidio brevior; III florens, subhyalina, ovata, tenuiter 5-nervia, acuminata, exaristata; palea subhyalina, glumae III subaequilonga, bicarinata. Stamina 3. Styli distincti, stigmatibus plumosis. Caryopsis palea involuta, libera. Gramen perenne, laxe caespitosum, humilum, foliis planis. Panicula terminalis laxe effusa, ramulis filiformibus. Spiculae parvae, numerosae.

[9] U. S. Dept. Agriculture, Bureau of Plant Industry, Bull. **68** (1905) 1–68.

Aniselytron agrostoides Merrill sp. nov.

Glabrum, laxe caespitosum, circiter 40 cm altum; foliis planis, lineari-lanceolatis, quam culmus brevioribus; paniculis terminalibus, laxis, ramulis gracillimis, patulis vel adscendentibus; spiculis viridibus, pedicellatis, circiter 3.5 mm longis; glumis vacuis 2, valde inaequalibus, I minuta, subobsoleta, vix 0.10 mm longa, truncata, II lanceolata, acuminata, uninervia, 1.5 ad 2 mm longa, III ovata, 3.5 mm longa, 5-nervia, acuminata, leviter carinata.

A laxly tufted, glabrous, perennial grass 40 cm high or less. Culms slender, unbranched, striate, smooth and shining, slightly geniculate; nodes two or three, black. Sheaths about equaling, or somewhat exceeding the internodes; ligule hyaline, ovate, about 3 mm long, acute or irregularly cleft at the apex; leaf-blades linear-lanceolate, flat, thin, smooth, 10 to 12 cm long, 3 to 4 mm wide, acuminate. Panicles 9 to 13 cm long, erect or somewhat nodding, the branches few, distant, slender, obscurely scabrid, the lower ones 4 to 5 cm long, ascending or spreading, comparatively few-flowered. Spikelets ovate-lanceolate, green, about 3.5 mm long, pedicelled. Empty glumes 2, the first subobsolete, suborbicular, truncate, hyaline, 0.10 mm long or less, the second lanceolate, acuminate, 1.5 to 2 mm long, 0.5 mm wide, 1-nerved. Flowering glume ovate (when spread), 3.5 mm long, 1.5 to 2 mm wide, slightly keeled, minutely scabrid on the keel, with 5 rather obscure nerves, submembranaceous, acuminate. Palea nearly as long as the flowering glume, similar to it in texture, acuminate, 2-keeled, minutely scabrid on the keels. Styles 2, plumose. Anthers 3, 1.2 mm long. Caryopsis brown, loosely enclosed by the palea, about 2 mm long. Callus obconic, with very few short hairs, the rachilla produced back of the palea into a straight, glabrous, slender, 0.8 mm long awn.

In the mossy forest, altitude about 2,400 m, not common, *Merrill 6483*, May, 1909.

This new genus is a member of the *Agrostideae*, and is undoubtedly most closely allied to the recently described *Aulacolepis* Hackel, which genus at present has two species, *A. japonica* Hack., of Japan, and *A. treutleri* Hack., of the Himalayan region. Suspecting the alliance of the Philippine plant to the above genus I sent a specimen to Doctor Hackel for comparison, regarding which he writes as follows: "The specimen of *Aniselytron*, which you have sent me, shows in the form of its spikelets great affinity with *Aulacolepis* (even in the furrowed palea), but it can scarcely be placed in that genus on account of the rudimentary first glume * * * I think it therefore better to consider it as a separate genus."

In habit *Aniselytron* is very similar to lax-panicled species of *Agrostis*, and is doubtless closely allied to that genus in spite of its glume characters, unawned flowering glume, and produced rachilla. The genus is well characterized by its strongly unequal empty glumes, the first being reduced to a mere rudiment, and the second one-half as long as the flowering glume.

During the ascent of Mount Pulog this plant was noticed in widely scattered loose tufts in the mossy forest, and was mistaken for *Agrostis elmeri* Merr.,

which it strongly resembles in habit. The latter species was found in abundance in the open grass lands above the limits of the mossy forest, and on the return trip, a few specimens of the plant above described were gathered, chiefly on account of the habitat, it being so entirely different from the usual habitat of *Agrostis elmeri*. In making the preliminary identifications of the Mount Pulog material, this number was referred to *Agrostis elmeri*, but in working over the material more carefully the number was found to consist of both the *Agrostis*, and the genus above described.

CALAMAGROSTIS Roth.

1. **C. filifolia** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 179, 375.

The most common grass on the open slopes above the mossy forest, *C. M. Z. 16180, Merrill 6610, 6611, McGregor 8891*, also in the upper pine region at the lower limits of the mossy forest, *C. M. Z. s. n.*

Known only from the higher mountains of the Benguet-Lepanto region, and most closely allied to species of South America and New Zealand.

DESCHAMPSIA Beauv.

1. **D. flexuosa** (Linn.) Trin. in Bull. Acad. Sci. St. Pétersb. 1 (1836) 66.

Aira flexuosa Linn. Sp. Pl. (1753) 65.

In open grass lands of the summit, rather common, *C. M. Z. 16155, Merrill 6354, McGregor 8904.*

A striking addition to the northern element in the Philippine flora, no species of the genus being previously known from the Archipelago. *Deschampsia flexuosa* is widely distributed in northern Asia and Europe, and in North America, from Greenland south along the mountains to North Carolina and Tennessee, also in Japan, and on Mount Morrison, Formosa; it is not reported from the Himalayan region, nor from China, although *Deschampsia caespitosa* (Linn.) Beauv. is found in both regions. The identification of the above species has been kindly verified by Doctor Hackel.

ELEUSINE Gaertn.

1. **E. indica** (Linn.) Gaertn. Fruct. 1 (1788) 8.

In stream depressions, lower pine region, *C. M. Z. 16211.*

Abundant and widely distributed in the Philippines at low and medium altitudes; Tropics of the Old World, now widely distributed in temperate and tropical regions in America.

ERAGROSTIS Host.

1. **E. distans** Hack. in Govt. Lab. Publ. (Philip.) **35** (1905) 81.

Steep slopes in the pine region, *C. M. Z. 16160.*

Known only from medium altitudes in the Benguet-Lepanto region.

MONOSTACHYA Merrill gen. nov.

Spiculae solitariae, rhachilla supra glumas inferiores et inter flores articulata, et flore imperfecto terminata, floribus 2 inferioribus hermaphroditis summo imperfecto. Glumae 2 inferiores vacuae, sub articulatione persistentes, parum inaequales, acutae, vix carinatae, extima obscure 5-nervia, secunda trinervia; florentes 4, 2 inferiores ovato-lanceolatae, dorso rotundatae, ecarinatae, obscure 7–9-nerviae, apice minute 2-dentatae, in mucronem brevem productae, margine tertia inferiore

ciliatae, caetero glabrae, 2 superiores vacuae; palea gluma brevior, bicarinata, bidenticulata. Stamina 3, antheris brevibus. Styli distincti, stigmatibus plumosis. Caryopsis oblonga, nitida, brunnea, hilo punctiforme. Gramina perennia, dense caespitosa, humilia, foliis involuto-setaceis. Panicula ad spiculam erectam, solitariam reducta.

Monostachya centrolepidoides Merrill sp. nov.

Dense caespitosa, glabra, 6 ad 10 cm alta; foliis involuto-setaceis, erectis, subrigidis, 2 ad 4 cm longis, 0.5 mm diametro; spiculis solitariis, parvis, lanceolatis, erectis, acuminatis, circiter 6 mm longis, pedunculo quam folia breviori.

A densely tufted perennial grass 6 to 10 cm high, glabrous except the lower margins of the flowering glumes, the culms fasciculately branched from the lower portions, the internodes very short. Sheaths rather loose, thin, exceeding the internodes; ligule a ring of weak, 1 mm long hairs; leaf-blades involute-setaceous, somewhat rigid, 2 to 4 cm long, 0.5 mm in diameter. Panicle reduced to a single erect spikelet, the peduncle erect, rigid, minutely scabrid, exserted 1 to 2 cm beyond the upper sheath; sometimes one or two 0.8 to 1 mm long pedicels of aborted spikelets are to be found near the apex of the culm below the solitary terminal spikelet. Spikelet green or straw-colored, lanceolate or narrowly lanceolate, acuminate, about 6 mm long, 1 to 1.3 mm in diameter; empty glumes 2, the first oblong-ovate, 3 mm long, 2 mm wide, acute, not keeled, glabrous, subhyaline, obscurely 5-nerved, the nerves somewhat convergent, not strictly parallel, the second similar to the first but 3.5 mm long and 3-nerved; flowering glumes 4, of which the lower two contain perfect flowers, the upper two being smaller and containing only a palea, the first flowering glume ovate-lanceolate, not keeled, 3.5 to 4 mm long, about 1.3 mm wide, obscurely 7- to 9-nerved, acuminate, the apex minutely 2-toothed, and with a straight, 1 mm long, scabrid, terminal mucro, the margins in the lower third somewhat ciliate-pilose with 0.5 to 0.8 mm long hairs. Palea linear-lanceolate, hyaline, 3 mm long, 0.8 mm wide, minutely 2-toothed, 2-keeled, the keels slightly scabrid. The second flowering glume and its palea similar to the first and like it containing a perfect flower. Third flowering glume similar to the first and second but smaller, about 2 mm long, containing a palea but no flower. Fourth flowering glume terminating the rachilla, very small, 1 to 1.5 mm long, flowerless, but containing a small palea. Callus to each flowering glume minutely ciliate. Joints of the rachilla glabrous, 0.8 to 1 mm long, articulated below each flowering glume. Caryopsis free from the palea, narrowly oblong, brown, shining, 1.5 mm long, 0.5 mm in diameter, the hilum punctiform.

Mount Pulog, Province of Benguet, Luzon, *For. Bur. 16088 Curran, Merritt & Zschokke*, January 5, 1909, growing in trails and open spots in the grass lands of the summit, altitude about 2,800 m.

This proposed genus is readily recognizable by its solitary, erect spikelet, a character most unusual in *Gramineae*. It was originally placed by me near the genus *Festuca*, differing in a number of characters. Specimens were sent to Dr. E. Hackel, and he has favored me with the following opinion regarding the genus:

"The floral structure of your *Monostachya* is near *Festuca* and *Bromus*, but is not identical with that of either genus. It comes still nearer to *Schizachne*, a genus recently described by me from the Island of Sachalin,[10] but differs from that genus in its flowering-glumes being only slightly notched and not 2-cleft at the apex, and in the short mucro emerging from between the teeth, not an arista emerging beneath the apical notch as in *Schizachne*. The habits of the two are quite different."

Doctor Hackel further calls attention to the fact that beneath the terminal spikelet on at least some of the culms are to be found one or two pedicels, 1 mm long or less, of abortive spikelets, from which he infers that the specimens do not show the normal state of the plant, but that it will really be found to have a few-flowered raceme when better developed plants are found, and that in this case the generic name I have selected will not be appropriate. The material I have had for examination has shown all stages of development of the spikelets from the flowers to mature seeds, and no culms were found with more than one spikelet developed. I have no doubt but that the form has been derived from some closely allied genus that normally, at least, has racemose, or compound panicles, but that the present plant is worthy of description as it stands.

In habit it closely approximates that of *Centrolepis philippinensis* Merr., from whence its specific name.

BRACHYPODIUM Beauv.

1. **B. sylvaticum** Beauv. subsp. **luzoniense** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 269, 387.

In the mossy forest, *C. M. Z. 16187*.

Known only from high altitudes in the Benguet-Lepanto region (subsp. *luzoniense*), the species widely distributed in Europe, northern Asia, the mountains of India, China, and Japan.

ARUNDINARIA Michx.

1. **A. niitakayamensis** Hayata in Bot. Mag. Tokyo **21** (1907) 49, Journ. Coll. Sci. Tokyo **25** [19] (1908) 240; Gamble *supra* 267.

Forming dense thickets between the upper border of the mossy forest and the upper grass lands, here 1.5 to 2.5 m high, and scattered in the lower parts of the open grass lands, here much dwarfed, and frequently only a few centimeters high, *C. M. Z. 16189, Merrill 6489* (both sterile), *McGregor 8893* (in flower).

This species has previously been collected on Mount Ugo, and at Pauai, Benguet, and on Mount Halcon, Mindoro, but Mr. McGregor was the first to collect it in flower, thus making its accurate identification possible. The identification has been made by Mr. J. S. Gamble, to whom specimens were sent, and to whom Doctor Hayata kindly sent fragments of the type for comparison. Otherwise known only from Mount Morrison, Formosa.

[10] Fedde Repert. **7** (1909) 322.

CYPERACÆ.

CYPERUS Linn.

1. **C. distans** Linn. f. Suppl. (1774) 103.

In the pine region, altitude about 1,400 m, *C. M. Z. 16162.*

Throughout the Philippines at low and medium altitudes; Tropics of the world.

MARISCUS Gaertn.

1. **M. cyperinus** (Retz.) Vahl Enum. 2 (1804) 377.

In the pine region, ascending to an altitude of 2,000 m, *C. M. Z. 16133, Merrill 6525.*

Widely distributed in the Philippines: India to Japan, Malaya, and Polynesia.

KYLLINGA Rottb.

1. **K. intermedia** R. Br. Prodr. (1810) 219.

Upper pine region, ascending to the lower limits of the mossy forest, *C. M. Z. 16142, Merrill 6539.*

Widely distributed in the Benguet-Lepanto region; Formosa, Australia, and the Fiji Islands.

SCIRPUS Linn.

Scirpus pulogensis Merrill sp. nov.

Species *S. pauciflorae* Lightf. valde affinis, differt culmis subrigidis, usque ad 60 cm longis, dense caespitosis, spiculis lanceolatis, 8 ad 10 mm longis, setis perichaetii glabris.

A perennial, densely caespitose plant, the culms terete, slender, rigid or subrigid, reaching a height of 60 cm, glabrous, leafless, the basal portions supplied with few, short, striate sheaths, tipped with linear, rigid, 2 to 8 mm long laminae, the sheaths of the innovations rather lax. Bract subtending the spikelet ovate to ovate-oblong, 4 mm long or less, prominently acuminate, the acumen often 1.5 mm long. Spikelets lanceolate, brown or pale-brown, 8 to 10 mm long, 2 mm wide, the first two glumes empty, ovate, about 3 mm long, 2 mm wide, 1-nerved, brown, acute or slightly acuminate, the 7 or 8 succeeding glumes bearing perfect flowers, 4 mm long, lanceolate, acuminate or merely acute, the margins in the upper parts sometimes obscurely lacerate. Achene oblong, brown, shining, smooth, 2 mm long, 1.6 mm in diameter, trigonous, apex slightly acuminate, base acute; style 3.5 mm long, continuous with the ovary; anthers 2 to 2.5 mm long, hypogynous bristles 4 or 6, white, slender, quite glabrous, equaling or slightly exceeding the achene.

In wet depressions of the summit grass lands, altitude about 2,700 m, *Merrill 6550* (type), *6616, C. M. Z. 16134.*

This species is manifestly very closely allied to *Scirpus pauciflorus* Lightf., which is widely distributed in Europe, northern Asia south to the western Himalayan region, and in North America, but appears to be distinguishable by the characters mentioned in the diagnosis.

BULBOSTYLIS Kunth.

1. **B. capillaris** (L.) Kunth Enum. 2 (1837) 212.

Widely distributed in the pine region, ascending to an altitude of 2,200 m, *C. M. Z. 16143, Merrill 6527.*

The Philippine form is referable to the var. *trifida* Clarke, which is widely distributed in the Tropics of the East; the species throughout the Tropics.

SCHOENUS Linn.

1. **S. apogon** R. & S. Syst. 2 (1817) 77.

In the summit grass lands, altitude about 2,700 m, *Merrill 6508.*

Known in the Philippines only from northern Luzon; Japan and the Riu Kiu Islands, northeastern Borneo, Australia, and New Zealand.

2. **S. axillaris** (R. Br.) Poir. in Lam. Encycl. Suppl. 2 (1811) 251.

Altitude and habitat not given, probably in the summit grass lands, *C. M. Z. 16141.*

Not previously reported from the Philippines; widely distributed in Australia and New Zealand.

An interesting addition to our knowledge of the Australian element in the Philippine flora. The specimens agree with the descriptions, and with Australian material in our herbarium, so identified.

GAHNIA Forst.

1. **G. javanica** Moritzi Verz. Zoll. Pfl. (1845–6) 98.

Summit grass lands, and along the upper border of the mossy forest, *C. M. Z. 16163, Merrill 6596.*

Widely distributed in the Philippines on the higher mountains; southern China, the Malay Peninsula and Archipelago to New Guinea and the Fiji Islands.

UNCINIA Pers.[11]

1. **U. rupestris** Raoul var. **capillacea** Kükenth. in Engl. Pflanzenreich, 38 (1909) 64.

In the mossy forest, altitude about 2,700 m, *C. M. Z. 16140.*

A most interesting addition to the list of Philippine genera, *Uncinia* consisting of twenty-three species, of which about one-half are found in South America, one extending to Mexico, the remainder mostly in New Zealand, a few in Australia and Tasmania, and one, *U. riparia* R. Br., extending northward to New Guinea. The present species is the first one of the genus to be found north of the equator in the Eastern Hemisphere. The species in New Zealand and Tasmania, the variety previously known only from New Zealand.

CAREX Linn.

1. **C. baccans** Nees in Wight Contrib. (1834) 122; Kükenth. in Engl. Pflanzenreich 38 (1909) 206.

Abundant in the mossy forest, above an altitude of 2,300 m, *C. M. Z. 16139, McGregor 8889, Merrill 6543.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; mountains of India and Ceylon to southern China, Sumatra, and Java.

[11] For identifications of the following species of *Uncinia* and *Carex* I am indebted to Rev. G. Kükenthal, of Coburg, Germany.

2. **C. breviculmis** R. Br., subsp. **royleana** Nees, var. **kingiana** (Lév. & Van.) Kükenth. l. c. 470.

In the summit grass lands, *McGregor 8853, Merrill 6609.*

Not previously reported from the Philippines, the variety in Japan and Formosa, the subspecies India to Japan and Formosa, the species in Australia and New Zealand.

3. **C. brunnea** Thunb. Fl. Jap. (1784) 38.

Common in the mossy forest above an altitude of 2,300 m, *McGregor 8866, Merrill 6505.*

Widely distributed on the higher mountains of the Philippines; mountains of India and Ceylon to the Mascarene Islands, China, Japan, Formosa, southward through Malaya to Australia, and New Caledonia.

4. **C. filicina** Nees in Wight Contrib. (1834) 123; Kükenth. l. c. 274.

Abundant in the summit grass lands, and also in the mossy forest, *Merrill 6499, 6507, 6615, McGregor 8827, C. M. Z. 16135, 16136, 16137, 16138.*

Widely distributed on the higher mountains of the Philippines; mountains of India and Ceylon to China, Java, and Sumatra.

5. **C. graeffeana** Boeckl. in Flora **58** (1875) 22; Kükenth. l. c. 403.

In the mossy forest, altitude about 2,400 m, *C. M. Z. 16132.*

Widely distributed on the higher mountains of the Philippines; Fiji.

6. **C. loheri** C. B. Clarke in Journ. Linn. Soc. Bot. **37** (1904) 14; Kükenth. l. c. 487.

In the mossy forest above an altitude of 2,300 m, *Merrill 6506, 6605, 6607.*

Known only from similar habitats in the Benguet-Lepanto region; endemic.

7. **C. rafflesiana** Boott var. **scaberrima** (Boeck.) Kükenth. l. c. 283.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16161.*

Widely distributed on the higher mountains of the Philippines; the variety in Sumatra, Java, Celebes, and Ternate, the species extending to tropical Australia.

8. **C. rara** Boott subsp. **capillacea** Boott Illustr. **1** (1858) 44, *t. 110;* Kükenth. l. c. 102.

Common in the summit grass lands, *Merrill 6612.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; Himalayan region to eastern Asia, and Japan; also in New South Wales.

9. **C. tristachya** Thunb. var. **pocilliformis** (Boott) Kükenth. l. c. 473.

In the summit grass lands, *Merrill 6606, McGregor 8856.*

Not previously reported from the Philippines; the variety in Japan and Formosa, the species also in southern and central China.

ARACEÆ.

RHAPHIDOPHORA Hassk.

1. **R. merrillii** Engl. Bot. Jahrb. **37** (1905) 115.

Stream depressions below 1,100 m, *C. M. Z. 16059.*

Low and medium altitudes, Luzon to Mindanao; endemic.

SCHISMATOGLOTTIS Zoll. & Mor.

1. **S. rupestris** Zoll. & Mor.; Engl. in DC. Monog. Phan. **2** (1879) 351.

Stream depressions below 1,100 m, *C. M. Z. 16057.*

Low and medium altitudes, Luzon to Mindanao; Java.

ARISAEMA Mart.

1. **A. polyphyllum** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) **27** (1905) 90.
A. cumingii Schott Syn. (1856) 28.

Characteristic of the mossy forest, terrestrial and epiphytic, above 2,200 m, *C. M. Z. 16352, Merrill 6474, 6473, 6617*, the last three numbers representing specimens with respectively small, medium, and large-sized leaves.

Luzon to Mindanao, on the higher mountains, exceedingly variable; endemic.

Var. **angustifolium** var. nov.

A typo differt foliolis multo angustioribus, lineari-lanceolatis, 5 ad 13 cm longis, 5 ad 10 mm latis.

Pine region below 2,000 m, *Merrill 6472*. Represented also by the following specimens: Province of Benguet, Pauai, *Bur. Sci. 8364, 8466 pp. McGregor;* Twin Peaks, *Elmer 6330:* District of Bontoc, Mount Polis, *For. Bur. 18387 Alvarez:* Province of Zambales, Botolan, *Maule s. n.*

This proposed variety at first sight is very distinct from the typical form of the species, especially in its vegetative characters. There is, however, some indication of intergrades between the species and the variety, and I have been unable to detect any constant floral characters between the two forms. The variety *angustifolium* appears to be confined to the grassy open slopes of the pine region, but the typical form is sometimes found in the same habitat, although usually confined to the mossy forest.

ERIOCAULACEÆ.

ERIOCAULON Linn.

E. depauperatum Merrill sp. nov.

Planta depauperata, dense caespitosa, aquatica, 2.5 ad 3 cm alta; foliis linearibus, 1 mm latis; pedunculis paucis, solitariis, vix exsertis; capitulis paucifloris; sepalis utriusque floris 2, petalis florum femineorum subobsoletis.

A small densely caespitose plant 2.5 to 5 cm high, glabrous throughout, entirely submerged. Leaves crowded, linear, flaccid, 1.5 to 4 cm long, composed of four or five distinct rows of quadrangular or oblong cells, base somewhat dilated, the lower part of the lamina 1 mm wide, gradually narrowed upward to the long-acuminate apex. Peduncles few, solitary, 1.5 cm long or less, not exserted, the heads subglobose, small, about 2 mm in diameter, each bearing from 4 to 6 pistillate flowers and 3 or 4 staminate ones, the bracts thin, oblong-obovate or oblong-ovate, about as long as the head. Staminate flowers: Sepals 2, oblong-ovate, about 1 mm long. Petals 3, very minute, glabrous, reduced to small, obscure, bodies less than 0.5 mm in length. Stamens 6; anthers dark-purple or black, nearly 0.2 mm long. Pistillate flowers: Sepals 2, orbicular-ovate, about 1.8 mm long and wide. Petals 3, oblong-lanceolate, 1.5 to 1.8 mm long, about 0.5 mm wide, pellucid, the cell structure distinct, the apex acute and with usually a small, black, apical dot, the base acuminate-stipitate, the stipe slender, often 0.5 mm in length. Ovary brown, 3-

celled, about 1 mm long; style 3 mm long, the arms 3, less than 0.4 mm in length.

Submerged in seepage pools of shallow water, about 40 cm in depth, in the open grass lands of the summit, altitude about 2,800 m, *Merrill 6590;* also in shallow water of the small pond on the summit of Mount Data, altitude about 2,250 m, *Merrill 4520,* November, 1905. A specimen collected by *Loher,* also on Mount Data (*1586* in Herb. Kew.) is probably the same.

A species apparently as closely allied to *E. minutum* Hook. f. of British India as to any other described species, but quite distinct from that so far as can be determined from the description.

JUNCACEÆ.

LUZULA DC.

1. **L. effusa** Buchenau Krit. Verz. Junc. (1880) 53, 88, Engl. Pflanzenreich **25** (1906) 61.

In the upper mossy forest and about ledges in lower border of the summit grass lands, altitude about 2,750 m, *Merrill 6490.*

Eastern Himalayan region and Szechuen, China.

Not previously reported from the Philippines, and a very interesting discovery, augmenting our knowledge of the Himalayan element in the Philippine flora.

The only species of the genus previously reported from the Archipelago is *L. campestris* (L.) DC. recorded by F.-Villar, Nov. App. (1882) 273. This record was almost certainly based on erroneously identified material, as F.-Villar mentions the plant he observed as having heads 2.4 to 4 cm in diameter. It is interesting to note here, however, that *Luzula campestris* (L.) DC., has recently been discovered in Luzon, Province of Benguet, Pauai, *Bur. Sci. 8426 McGregor,* June, 1909, growing in pine forests, altitude about 2,000 m. The specimen seems to be most closely allied to the var. *capitata* Miq., of Japan.

LILIACEÆ.

DIANELLA Lam.

1. **D. ensifolia** (L.) Red. Lil. (1802) *t. l.*

Common in the mossy forest, and along its lower borders, *Merrill 6585, McGregor 8873, C. M. Z. 16199, 18073.*

Widely distributed at higher altitudes in the Philippines; India to China and Formosa through Malaya to Australia and the Mascarene Islands.

2. **D. caerulea** Sims Bot. Mag. *t. 505.*

Stream depressions in the pine region, altitude about 1,500 m, *C. M. Z. 16194, Merrill 6512bis.*

Widely distributed on the higher mountains of the Philippines; New Guinea and Australia.

LILIUM Linn.

1. **L. philippinense** Baker in Gard. Chron. (1873) 1141.

In the pine region, open slopes, and in stream depressions, ascending to 2,000 m, *C. M. Z. 18115, Merrill 6513.* Locally known as *suyasoy.*

In the Philippines confined to the Benguet-Lepanto region; also found in Formosa.

DISPORUM Salisb.

1. **Disporum luzoniense** Merrill sp. nov.
D. pullum Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 182, non Salisb.

Caulis glaber, usque ad 40 cm altus, strictus; foliis oblongo-ellipticis vel oblongo-ovatis, membranaceis, acuminatis, petiolatis, nervis usque ad 9, transversalibus vix distinctis; floribus axillaribus, solitariis, cernuis, albis, intus purpureo-maculatis, perianthii segmentis circiter 1.5 cm longis, basi saccatis; staminibus quam perianthium multo brevioribus.

Rootstock stout, 5 to 8 mm in diameter. Stems solitary, erect, unbranched, stout, glabrous. Leaves 4 to 8 on the upper half of the stem, oblong-elliptic to oblong-ovate, membranaceous, 8 to 11 cm long, 3 to 4.5 cm wide, base rounded or acute, apex prominently acuminate, acumen blunt; primary nerves 5 to 9, distinct, the secondary ones also often somewhat prominent, the transverse veinlets obscure; petioles 3 to 12 mm long. Flowers axillary, solitary, nodding, the peduncles 1.5 to 2 cm long. Perianth 1.5 cm long, campanulate, white, marked with dull-purple within, the segments 3 mm wide, 3-nerved, saccate at the base. Anthers 1.5 mm long. Ovary ovoid. Fruit dark-blue or black when mature, globose, fleshy, about 1 cm in diameter; seeds obovoid, 4 mm long.

This species, previously confused with *Disporum pullum* Salisb., is represented by the following specimens, all from northern Luzon: District of Lepanto, Mount Data, *Bur. Sci. 5942 Ramos, Merrill 4857:* Province of Benguet, Mount Pulog, *For. Bur. 16193 Curran, Merritt, & Zschokke;* Pauai, *Merrill 6619* (type), *For. Bur. 14442 Darling, Bur. Sci. 8483 McGregor, Bur. Sci. 4316 Mearns.*

It is confined to the region of the mossy forest, above an altitude of 2,000 m, and at Pauai it flowers in May and June. It is allied to *Disporum pullum* Salisb., and apparently also to *D. uniflorum* Baker, but is distinct from both. It is well characterized by its unbranched stems, solitary, axillary, nodding flowers which are white, marked with dull-purple inside, and its stamens much shorter than the perianth.

OPHIOPOGON Ker.

1. **O. japonicus** (L.) Ker in Bot. Mag. *t. 1063.*
In the mossy forest, *C. M. Z. 16191, McGregor 8816, Merrill 6485.*
On the higher mountains in Luzon, widely distributed at higher altitudes in the Benguet-Lepanto region; Japan to China, and Formosa.

ALETRIS L.

1. **A. spicata** (Thunb.) Franch. in Journ. de Bot. 10 (1896) 199.
Upper pine region, altitude about 2,000 m, and in the open grass lands above the mossy forest, altitude about 2,800 m, *C. M. Z. 16192.*
Known in the Philippines only from higher altitudes in the Benguet-Lepanto region; Japan to central and southern China, and Formosa.

SMILAX L.

1. **S. china** Linn. Sp. Pl. (1753) 1029.

Common in the mossy forest, variable, *C. M. Z. 16131, 16198, Merrill 6494, 6552.*

Common at higher altitudes in the Benguet-Lepanto region, and also on Mount Halcon, Mindoro; Japan to southern China and Formosa.

2. **Smilax pygmaea** Merrill sp. nov. § *Nemexia.*

Suffrutex erectus, strictus, inermis, 20 ad 40 m altus, ecirrhiferus; foliis alternis, oblongo-ovatis, 3–5-nerviis, petiolo inflato; umbellis axillaribus, solitariis, paucifloris; floribus circiter 3 mm longis.

Erect, unbranched, glabrous, woody or suffrutescent, from a thickened root, the stems terete, unarmed, yellowish or olivaceous. Leaves alternate, oblong-ovate, firmly chartaceous or subcoriaceous, 1.5 to 3 cm long, 7 to 15 mm wide, dull or slightly shining, beneath subglaucous or pale, often somewhat reflexed, base rounded or subcordate, apex acute or sharply apiculate-acuminate; nerves 3 or 5, distinct, reticulations prominent; petioles 7 to 10 mm long, apparently jointed with the lamina, and persistent on the stem after the fall of the leaf-blade, deeply channeled and inflated in the lower two-thirds, half clasping the stems. Umbels in the upper axils, solitary, 4- to 6-flowered, the peduncles curved, slender, 1 to 1.5 cm long; pedicels 5 to 7 mm long. Pistillate flowers 3 mm long, the sepals 3, elliptic-oblong, 3 mm long, erect; petals 3, similar to the sepals; rudimentary stamens 2 or 3, 2 mm long. Ovary elliptic, glabrous, 3-celled, each cell with two ovules; styles stout, nearly 1 mm long. Fruit globose (immature) about 5 mm in diameter, with a single seed.

In the open grass lands of the summit above 2,700 m altitude, *Merrill 6598,* May 1909, with flowers and immature fruits, *McGregor 8902,* July, 1909, with immature fruits.

A species apparently most closely allied to *Smilax biflora* Miq. of Japan, but quite different from that species. Well characterized by its erect, strict habit, small size, absence of spines and tendrils, and other characters.

DIOSCOREACEÆ.

DIOSCOREA Linn.

1. **D. luzonensis** Schauer in Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1:444.

In stream depressions, lower pine region, *Merrill 6512.*

Rather widely distributed in Luzon; endemic.

CANNACEÆ.

CANNA Linn.

1. **C. indica** Linn. Sp. Pl. (1753) 1.

In cultivated lands, pine region, altitude about 1,500 m, *C. M. Z. 16351.*

Widely distributed in the Philippines at low and medium altitudes, especially about towns, and in waste places; Tropics of the world.

ORCHIDACEÆ.[12]

MICROTIS R. Br.

1. **M. unifolia** (Forst.) Reichb. f. Beitr. Syst. Pl. (1871) 62.

In the open pine region, altitude 1,800 to 2,000 m, *C. M. Z. 16344.*

In the Philippines known only from the Benguet-Lepanto region; Japan, Formosa, southern China, Java, New Caledonia, Australia, and New Zealand.

COELOGYNE Lindl.

1. **C. integerrima** Ames in Philip. Journ. Sci. 4 (1909) Bot. 665.

In the mossy forest, *Merrill 6350* (type), altitude about 2,200 m; doubtless also represented by *McGregor 8822*, the specimen in fruit.

Known only from Mount Pulog.

DENDROCHILUM Bl.

1. **D. anfractoides** Ames Orchidaceae **3** (1908) 13, *pl. 28.*

In the mossy forest, altitude not given, *McGregor 8834.*

Known only from high altitudes in Benguet Province.

2. **D. arachnitis** Reichb. f. in Gard. Chron. N. S. **17** (1882) 256.

In the mossy forest above an altitude of 2,200 m, *Merrill 6481.*

Higher mountains of the Philippines from northern Luzon to southern Mindanao; endemic.

3. **D. cinnabarinum** Pfitzer in Engl. Pflanzenreich **32** (1907) 104.

In the mossy forest above an altitude of 2,200 m, *Merrill 6475, McGregor 8844, C. M. Z. 16348.*

Higher mountains of northern Luzon; endemic.

4. **D. loheri** Ames Orchidaceae **3** (1908) 12, *pl. 27, I.*

In the mossy forest above an altitude of 2,200 m, *Merrill 6476.*

Higher mountains of northern Luzon; endemic.

Mr. Ames notes on the sheet that the specimen is not typical, the flower-shoots being considerably shorter than the leaves.

5. **D. pulogense** Ames in Philip. Journ. Sci. 4 (1909) Bot. 594.

In the mossy forest above an altitude of 2,200 m, *C. M. Z. 16342, 16347, Merrill 6478, Copeland s. n.*

Known only from Mount Pulog.

6. **D. tenuifolium** (Ames) Pfitz. in Engl. Pflanzenreich **32** (1907) 114.

In the mossy forest above an altitude of 2,200 m, *McGregor 8811.*

Known only from the higher mountains of the Benguet-Lepanto region.

7. **D. uncatum** Reichb. f. in Bonplandia **3** (1855) 222.

In the mossy forest above an altitude of 2,200 m, *Merrill 6477.*

Mountains of northern and central Luzon; endemic.

[12] Identifications by Mr. Oakes Ames, North Easton, Massachusetts, U. S. A.

8. **D. venustulum** (Ames) Pfitz. in Engl. Pflanzenreich 32 (1907) 116.
In the mossy forest above an altitude of 2,200 m, *Merrill 6635*.
Known only from the higher mountains of the Benguet-Lepanto region.
9. **D.** sp.
In the mossy forest, *McGregor 8849;* an undescribed form, *fide* Ames.

CESTICHIS Pfitz.

1. **C.** sp. aff. **C. benguetensis** Ames Orchidaceae 1 (1905) 9, *t. 3*.
In the mossy forest, altitude about 2,200 m, *C. M. Z. 16350*, the specimens without flowers.
The species is known only from the higher mountains of Benguet.

OBERONIA Lindl.

1. **O. cylindrica** Lindl. Bot. Reg. (1840) Misc. 20.
In the mossy forest above an altitude of 2,200 m, *Copeland s. n., McGregor 8823, Merrill 6480, 6573.*
Widely distributed in the Benguet-Lepanto region at higher altitudes; endemic.

EULOPHIA R. Br.

1. **E. squalida** Lindl. Bot. Reg. (1841) Misc. 77.
On talus slopes in the lower pine region, altitude about 1,200 m, *Merrill 6501.*
Known in the Philippines from Luzon and Palawan; Malaya.

DENDROBIUM Sw.

1. **D. heterocarpum** Wall. ex Lindl. Orch. Pl. (1830) 78.
On boulders in the pine forest below an altitude of 1,300 m, *C. M. Z. 16345.*
India, Ceylon, Burma, and Java.

ERIA Lindl.

1. **E. ornata** (Bl.) Lindl. Orch. Pl. (1830) 66.
On boulders in stream depressions, lower pine region, *Merrill 6482.*
Rather widely distributed in northern and central Luzon; Sumatra, Java, Borneo, and ? Siam.
2. **E. philippinensis** Ames Orchidaceae 1 (1905) 94.
Abundant in the mossy forest above an altitude of 2,200 m, *C. M. Z. 16346, 16349, Merrill 6351, 6479.*
Mountains of central and northern Luzon; endemic.
3. **E. ventricosa** Leavitt in Philip. Journ. Sci. 4 (1909) Bot. 211, 234, *fig. 16.*
In the mossy forest, altitude about 2,700 m, *Copeland s. n.*
Mountains of Luzon and Mindoro; endemic.

SACCOLABIUM Bl.

1. **S. compressum** Lindl. Bot. Reg. (1840) Misc. 9.
In the pine region, altitude about 1,300 m, *C. M. Z. 16343.*
Of wide distribution in the Philippines; endemic.

PIPERACEÆ.

PIPER L.

1. **P.** sp.

In the mossy forest, altitude about 2,250 m, *C. M. Z. 16240.*

2. **P.** sp.

In stream depressions, altitude about 1,500 m, *Merrill 6530.*

PEPEROMIA Ruiz & Pav.

1. **P. reflexa** A. Dietr. Sp. Pl. 1 (1831) 180.

On boulders in stream depressions, altitude about 1,200 m, *C. M. Z. 16239, McGregor 8894.*

Mountains of India, China, and Malaya, also in Africa, Australia, and America.

CHLORANTHACEÆ.

CHLORANTHUS Linn.

1. **C. brachystachys** Bl. Fl. Jav. Chloranth. (1828) 13, *pl. 2.*

In the mossy forest above 2,000 m, *C. M. Z. 16095, McGregor 8871.*

Throughout the Philippines at medium and higher altitudes; India to southern China and Malaya.

FAGACEÆ.

QUERCUS Linn.

1. **Q. luzoniensis** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 323.

In the mossy forest at an altitude of about 2,500 m, *C. M. Z. 16062, 18063, 18070, 18079,* and possibly also *C. M. Z. 18087,* the latter having much larger fruits, but otherwise very similar to the type of the species.

Known only from similar habitats in the Benguet-Lepanto region and from the mountains of Zambales.

2. **Q. woodii** Hance in Journ. Bot. **12** (1874) 240; Merr. l. c. 326.

In the lower parts of the mossy forest, altitude about 2,200 m, *C. M. Z. 18152.*

Known only from the mountains of Benguet.

3. **Q.** sp.

In the mossy forest, altitude about 2,500 m, *C. M. Z. 18061.* The specimen is sterile and is very similar to *Q. luzoniensis,* but the leaves are entirely glabrous.

MORACEÆ.

FICUS Linn.

1. **F. hauili** Blanco Fl. Filip. (1837) 684.

In stream depressions in the pine region, below an altitude of 1,300 m, *C. M. Z. 18217.*

Widely distributed in the Philippines at low and medium altitudes; endemic.

2. **F. cumingii** Miq. in Hook. Lond. Journ. Bot. **7** (1848) 235.

On slopes in the pine region, altitude below 1,400 m, *C. M. Z. 18192.*

Widely distributed in the Philippines at low and medium altitudes; endemic.

3. **F. fastigiata** Elm. Leafl. Philip. Bot. **1** (1906) 44.

Lower parts of the mossy forest, *C. M. Z. 18140.*

Higher altitudes on the mountains of the Philippines; endemic. It seems probable that this species, as well, perhaps, as *F. guyeri* Elm., will have to be combined with *F. validicaudata* Merr.

4. **F. nota** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) **17** (1904) 10.

In stream depressions in the pine region below an altitude of 1,500 m, *C. M. Z. 18218, 18183.*

Very common and widely distributed in the Philippines at low and medium altitudes; endemic.

5. **F. pseudopalma** Blanco Fl. Filip. (1837) 680.

In pine forests below an altitude of 1,500 m, *C. M. Z. 18184;* locally known as *cadiabung.*

Widely distributed in the Philippines at low and medium altitudes; endemic.

6. **Ficus curranii** Merrill sp. nov. § *Sycidium.*

Arbor parva, 4 ad 6 m alta, ramulis plus minus furfuraceo-lepidotis, novellis ferrugineo-hirsutis; foliis oblongo-ellipticis, chartaceis vel subcoriaceis, acuminatis, basi acutis, nervis utrinque 7 ad 9, subtus prominentibus; receptaculis axillaribus, solitariis, ellipsoideis vel elliptico-obovoideis, circiter 1.5 cm longis, pedunculo usque ad 2 cm longo, apice 3-bracteolato.

A small tree 4 to 6 m high, the branches terete, reddish-brown, glabrous, the younger ones somewhat striate when dry, and furfuraceous-lepidote, the growing parts ferruginous-hirsute, sometimes rather densely so. Leaves alternate, oblong-elliptic, chartaceous or subcoriaceous, 7 to 10 cm long, 2 to 4 cm wide, glabrous, smooth, somewhat shining when dry, on the lower surface paler and minutely obscurely puncticulate, the apex shortly acuminate, the base acute; nerves 7 to 9 on each side of the midrib, prominent beneath, spreading, curved upward and anastomosing, the reticulations rather lax, distinct, the ultimate ones fine; petioles 5 to 10 mm long, furfuraceous or slightly hirsute; stipules deciduous, acuminate, brown, glabrous, 1.5 cm long. Receptacles solitary, axillary, peduncled, elliptic or elliptic-obovoid, about 1.5 cm long, 1 cm in diameter, wrinkled when dry, glabrous, the peduncle 1 to 2 cm long, ultimately glabrous, with three small, ovate, 1 mm long bracts at the apex. Only fertile female flowers observed, numerous, sessile or shortly pedicelled, the perianth apparently wanting; style lateral, about 1 mm long.

The type of this species, from which the above description was taken, is *For. Bur. 5007 Curran,* from Mount Tonglon, Province of Benguet, Luzon, altitude about 2,200 m; it is apparently also represented by *For. Bur. 10821 Curran,* and by *For. Bur. 18132 Curran, Zschokke, & Merritt,* the latter from the mossy forests of Mount Pulog, and with very immature fruits. The species apparently belongs in the section *Sycidium,* although the discovery of male flowers may modify this disposition of it; apparently as closely allied to *Ficus lucbanensis* Elm., as to any other species, but distinguished by its smaller leaves, and quite differently shaped, longer-peduncled fruits.

URTICACEÆ.

URTICA Linn.

1. **U. bullata** Bl. Mus. Bot. Lugd.-Bat. **2** (1856) 145.
In ravines, upper pine region, altitude about 1,900 m, *C. M. Z. 16049.*
Java.

PILEA Lindl.

1. **P. melastomoides** Wedd. in Ann. Sci. Nat. IV **1** (1854) 186 ?
In ravines in the upper pine region, altitude about 1,800 m, *C. M. Z. 16045.*
This form is known in the Philippines only from the Benguet-Lepanto region; India and Malaya.

2. **P.** sp.
In ravines in the upper pine region, *C. M. Z. 16052.*
An apparently undescribed form, known only from the Benguet-Lepanto region.

3. **P.** sp.
In the mossy forest and on rock outcroppings in the summit grass lands, *C. M. Z. 16042, 16046, Merrill 6510.*

ELATOSTEMA Forst.

There are two species of this genus represented in the collections from Mount Pulog, *C. M. Z. 16047*, and *C. M. Z. 16050, Merrill 6568;* the latter is apparently confined to Benguet Province, the former more widely distributed in Luzon. Both species are apparently undescribed.

POUZOLZIA Gaudich.

1. **P.** sp.
In the upper pine region, altitude about 1,900 m, *C. M. Z. 18117, Merrill 6561.*
An apparently undescribed form, known only from the Benguet-Lepanto region.

GONOSTEGIA Turcz.

1. **G. hirta** (Blume) Miq. Ann. Mus. Bot. Lugd. Bat. **4** (1869) 303.
In the upper pine region, extending into open places in the mossy forest, *C. M. Z. 16044, Merrill 6516, McGregor 8826.*
In the Philippines known from the Benguet-Lepanto region, and from Mindanao; India to Malaya.

PIPTURUS Wedd.

1. **P. asper** Wedd. Ann. Sci. Nat. IV. **1** (1854) 197.
Widely distributed in ravines in the pine region, ascending to an altitude of about 1,900 m, *C. M. Z. 18119, 18210.*
Widely distributed in the Philippines at low and medium altitudes; Borneo.

CHAMABAINIA Wight.

1. **C. cuspidata** Wight Ic. **6** (1853) 11, *pl. 1981.*
In the summit grass lands, altitude about 2,700 m, *C. M. Z. 16043.*
Otherwise known in the Philippines only from Mount Data; northern India to Ceylon and southwestern China.

DEBREGEASIA Gaudich.

1. **D. longifolia** (Burm.) Wedd. in DC. Prodr. **16**[1] (1869) 235.[24]
In the mossy forest above an altitude of 2,200 m, *C. M. Z. 18104, 18147.*
Known in the Philippines only from the Benguet-Lepanto region; India and Java.

LECANTHUS Wedd.

1. **L. peduncularis** (Wall.) Wedd. in DC. Prodr. **16**[1] (1869) 164.

In the mossy forest, *C. M. Z. 16048.*

In the Philippines known only from the Benguet-Lepanto region; Northern India, Yunnan, and Szechuen.

LORANTHACEÆ.

LORANTHUS L.

1. **L. pentapetalus** Roxb. Fl. Ind. 1 (1820) 190.

Stream depression in the lower pine region, altitude about 1,200 m, *C. M. Z. 16231.*

Widely distributed in the Philippines; India to southern China and Malaya.

2. **L. benguetensis** Merr. in Philip. Journ. Sci. 4 (1908) Bot. 134.

Parasitic on *Pinus insularis* Endl., altitude about 1,200 m, *C. M. Z. 16064.*

Known only from Benguet Province, Luzon.

3. **L. copelandii** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 185, 4 (1909) Bot. 140.

Stream depressions below an altitude of 1,500 m, *C. M. Z. 16232, 18176.*

Known only from Benguet Province, Luzon.

4. **L. halconensis** Merr. l. cc. 2:271; 4: 143.

Habitat not given, *C. M. Z. 16230.*

Otherwise known only from Mount Halcon, Mindoro.

5. **L. curranii** Merr. l. c. 4:144.

In the mossy forest, *C. M. Z. 18143.*

Known otherwise only from Mount Tonglon, Benguet Province, Luzon.

6. **L. congestiflorus** Merr. l. c. 4:147.

Very abundant in the mossy forest, extending to its upper limits, *C. M. Z. 18045, 18084, Merrill 6597, McGregor 8833, 8888.*

Widely distributed on the higher mountains of the Philippines; endemic.

CLEISTOLORANTHUS Merr.

1. **C. verticillatus** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 150.

In the mossy forest, altitude about 2,500 m, *C. M. Z. 16229.*

A monotypic, endemic genus, known only from Mount Pulog.

GINALLOA Korth.

1. **G. cumingiana** (Presl) F.-Vill. var. **angustifolia** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 153.

Stream depressions in the pine region, altitude below 1,500 m, *C. M. Z. 16242.*

An endemic species; the variety known otherwise only from Mount Canlaon, Negros.

BALANOPHORACEÆ.

BALANOPHORA Forst.

1. **B. micrantha** Warb. in Perk. Frag. Fl. Philip. (1905) 169.

In ravines, mossy forest at 2,600 m altitude, *C. M. Z. 16451.*

I have not seen the type of Warburg's species, which was collected in the mountains of Luzon by Loher. The specimen cited above, although imperfect, agrees closely with the description; it forms rather dense hemispherical masses nearly 15 cm in diameter. Endemic.

POLYGONACEÆ.

POLYGONUM Linn.

1. **P. chinense** Linn. Sp. Pl. (1753) 363.

In stream depressions, on open pine-covered slopes, and in the mossy forest, altitude 1,500 to 2,400 m, *C. M. Z. 16053* (infested with *Ustilago treubii* Solms), *16054, 16056, McGregor 8840.*

Widely distributed in the Philippines at medium and higher altitudes; India to China, Japan, and Malaya.

2. **P. posumbu** Ham. in Don Prodr. (1825) 71.

In the upper pine region, *Merrill 6575.*

Known in the Philippines only from the Benguet-Lepanto region; India to China, Japan, and Java.

3. **P. punctatum** Ham. l. c. 72.

On steep, grass-covered slopes in the upper pine region, 2,000 m altitude *C. M. Z. 16055.*

Known in the Philippines only from the Benguet-Lepanto region; mountains of India, Ceylon, China, Japan, and Java.

CHENOPODIACEÆ.

CHENOPODIUM Linn.

1. **C. ambrosioides** Linn. Sp. Pl. (1753) 219.

Slopes in the pine region, altitude 1,600 m, *C. M. Z. 16037.*

Widely distributed in the Philippines at low and medium altitudes, probably introduced; tropical and temperate regions of the world.

AMARANTHACEÆ.

AMARANTHUS Linn.

1. **A. spinosus** Linn. Sp. Pl. (1753) 991.

Altitude not stated, *C. M. Z. 16237.*

Widely distributed in the Philippines, especially abundant in gravelly stream beds during the dry season; Tropics of the world.

CARYOPHYLLACEÆ.

ARENARIA Linn.

1. **A. serpyllifolia** Linn. Sp. Pl. (1753) 423.

Upper pine slopes, a weed in sweet-potato patches, *C. M. Z. 16077.*

Temperate and subtemperate regions of the world; known in the Philippines only from high altitudes in the Benguet-Lepanto region.

DRYMARIA Willd.

1. **D. cordata** Willd. ex Roem. & Schult. Syst. 5 (1819) 406.

Weed in sweet-potato patches, altitude 1,300 m, *C. M. Z. 16061.*

Widely distributed in the Philippines at low and medium altitudes, probably introduced from tropical America; now distributed throughout the Tropics of the world.

POLYCARPAEA Lam.

1. **P. corymbosa** (Linn.) Lam. Ill. 2 (1797) 129.

Open slopes, pine region, altitude 1,500 m, *C. M. Z. 16058*.

Widely distributed in the Philippines at low and medium altitudes; Tropics of the world.

SAGINA Linn.

1. **S. procumbens** Linn. Sp. Pl. (1753) 128.

On rock outcroppings in open grass lands at the summit, altitude about 2,850 m, *C. M. Z. 16060*.

Known in the Philippines only from the Benguet-Lepanto region; widely distributed in the north temperate zone.

RANUNCULACEÆ.

CLEMATIS Linn.

1. **Clematis macgregorii** Merrill sp. nov. § *Flammula*.

Scandens, inflorescentiis exceptis glabra, dioica vel polygamo-dioica; foliis trifoliolatis, foliolis ovatis, membranaceis vel chartaceis, basi 5- vel 7-nerviis, cordatis, apice breviter obtuse acuminatis, integris vel supra pauce denticulatis; floribus tetrameris, paniculatis, sepalis extus ferrugineo-pubescentibus, antheris apice longe aristatis.

A scandent woody vine, glabrous except the inflorescence, dioecious or polygamo-dioecious. Stems at least 5 mm in diameter, terete, covered with very large lenticels, the branchlets slender, striate, grayish- or reddish-brown. Leaves 3-foliolate, or the upper ones sometimes simple, their petioles 2.5 to 7 cm long, the petiolules 1.5 to 3 cm long, the leaflets ovate, membranaceous or chartaceous, 4 to 6 cm long, 2 to 3 cm wide, somewhat shining when dry, the base broad, cordate, the apex shortly and obtusely acuminate, or sometimes obtuse or even rounded, the margins entire or sometimes with few, small, scattered teeth, especially in the upper part; nerves 5 or 7 from the base, rather distinct, anastomosing, the reticulations distinct, lax; stipules about 4 mm long, often 1 cm wide, truncate, clasping the stem; tendrils infra-axillary, at least 6 cm long, branched. Inflorescence axillary, and terminating the short lateral branches, paniculate, more or less ferruginous-pubescent, the pedicels 1-flowered. Staminate flowers 4-merous, the sepals oblong-lanceolate, obtuse or acute, densely ferruginous-pubescent with short hairs on the outside, 10 mm long, 2.5 to 3 mm wide, rather finely 5- or 6-nerved. Petals none. Stamens many, 4 to 9 mm long, the connective slender, much produced above the anther, on the longer stamens often 3 mm in length, the anthers 1 to 1.5 mm long; filaments glabrous. Pistillate flowers larger than the staminate ones, the sepals similar but up to 18 mm long, 3 to 3.5 mm wide. Petals none. Staminodes slender, linear, about 8, up to 14 mm long, less than 1 mm wide, some of them frequently antheriferous. Styles covered with long white hairs. Mature achenes unknown.

At the base of the mossy forest, altitude about 2,100 m, *Bur. Sci. 9929 McGregor*, July 4, 1909, staminate flowers (type); also two specimens from Pauai, across the Agno River from Mount Pulog, in similar habitats, *Bur. Sci. 8372 McGregor*, June, 1909, staminate flowers, and *Bur. Sci. 4347 Mearns*, July, 1907, pistillate flowers.

Manifestly allied to *Clematis aristata* R. Br. of eastern Australia and eastern Malaya, but apparently sufficiently distinct from any of the hitherto described forms of that species.

2. **C. leschenaultiana** DC. Syst. 1 (1818) 151.

In the upper pine region, altitude about 2,000 m, *C. M. Z. 16105*.

Known in the Philippines only from the Benguet-Lepanto region, and from Mount Apo, Mindanao; Malay Archipelago.

ANEMONE Linn.

1. **A. vitifolia** Ham. ex DC. Syst. 1 (1818) 210.

In thickets and open places near the lower border of the mossy forest, altitude about 2,200 m, *C. M. Z. 18125, McGregor 8879, Merrill 6544*.

Widely distributed at higher altitudes in the Benguet-Lepanto region, but otherwise unknown in the Philippines; Himalayan region to southern China, and Formosa.

Locally known as *cabcabo* and Merritt notes that the indumentum of the achenes is used by the Igorots as tinder.

RANUNCULUS Linn.

1. **R. philippinensis** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 99.

In the upper border of the mossy forest and in ravines along streamlets in the summit grass lands, *Merrill 6608*.

Known only from high altitudes in the Benguet-Lepanto region.

BERBERIDACEÆ.

BERBERIS Linn.

1. **B. barandana** Vid. Rev. Pl. Vasc. Filip. (1886) 45; Schneider in Bull. Herb. Boiss. II 5 (1905) 402.

In the mossy forest above 2,000 m, *C. M. Z. 18039, 18050, Merrill 6601, McGregor 8864*.

A species characteristic of the mossy forest of the high table-land of north central Luzon; apparently also found in Formosa. Very closely allied to *B. wallichiana* DC. of the Himalayan region, Khasia Mountains and southern China. The Igorot name is *bagis*, and the bark is used as a purgative.

Mahonia nepalensis DC., the only other species of the family at present known from the Philippines, is also a characteristic plant of the region, but has not as yet been found on Mount Pulog. Both must be considered as Himalayan types.

MAGNOLIACEÆ.

TALAUMA Juss.

1. **T. villariana** Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 307.

In stream depressions in the pine region below an altitude of 1,400 m, *C. M. Z. 18196, 18200*.

Widely distributed in Luzon at low and medium altitudes; endemic.

DRIMYS Forst.

1. **D. piperita** Hook. f. Ic. *t. 896.*

Very abundant in the mossy forest, *C. M. Z. 18037, 18043, Merrill 6600, McGregor 8897.* Igorot, *inototan.*

Widely distributed in the Philippines, on the higher mountains from northern Luzon to southern Mindanao; mountains of Borneo and New Guinea.

LAURACEÆ.

NEOLITSEA (Benth.) Merr.

1. **N. microphylla** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 56.

In the mossy forest, altitude about 2,300 m, *C. M. Z. 18071.*

Higher mountains of central and northern Luzon; endemic.

2. **Neolitsea megacarpa** Merrill sp. nov.

Arbor glabra vel subglabra, usque ad 15 m alta; foliis crasse coriaceis, oblongo-ellipticis, nitidis, utrinque concoloribus vel subtus leviter glaucescentibus, acuminatis, basi triplinerviis; nervis utrinque 4 vel 5, distinctis; fructibus ellipsoideis, 2 cm longis.

A glabrous or subglabrous tree reaching a height of 15 m. Branches brown, terete, glabrous, the growing shoots somewhat pubescent. Leaves alternate, somewhat crowded toward the apices of the branchlets, oblong-elliptic, thickly coriaceous, shining, of the same color on both surfaces or slightly glaucous beneath, 8 to 12 cm long, 3 to 5 cm wide, when young often pubescent on the midrib beneath, base acute, apex acuminate; nerves 4 or 5 on each side of the midrib, curved-ascending, the lowest pair reaching about to the middle of the leaf, laxly anastomosing, the secondary veins indistinct, the ultimate ones forming a very dense, subfoveolate reticulation; petioles 2.5 to 3 cm long, when young somewhat pubescent, ultimately glabrous; buds terminal and axillary, densely ferruginous-pubescent. Flowers unknown. Fruit axillary, black or blue-black when mature, shining, ellipsoid or ovoid, 2 cm long, about 1.5 cm in diameter, wrinkled when dry, the persistent calyx disk-shaped, about 1 cm in diameter.

In the mossy forest, altitude about 2,250 m, *C. M. Z. 18110, 18144,* locally known as *dundunosen;* also known from Mount Ugo, Benguet, *Bur. Sci. 5709 Ramos,* December, 1908.

3. **N. villosa** (Bl.) Merr. in Philip. Journ. Sci. 4 (1909) 261.

In stream depressions, pine region, *C. M. Z. 18215.* The specimen is sterile and quite glabrous, but is probably referable here.

Widely distributed at higher altitudes in the Philippines; Malaya.

MACHILUS Nees.

1. **Machilus curranii** Merrill sp. nov.

Arbor glabra, 5 ad 6 m alta; foliis late elliptico-ovatis, coriaceis, nitidis, utrinque concoloribus vel subtus pallidioribus, basi acutis, apice abrupte breviter vel subcaudato-acuminatis, nervis utrinque 5 vel 6; fructibus globosis vel depresso-globosis, circiter 8 mm diametro.

A glabrous tree 5 to 6 m high. Branches dark-reddish-brown, terete, slender, the bud-scales very slightly pubescent. Leaves broadly elliptic-ovate, coriaceous, shining, of the same color on both surfaces or paler beneath, 3 to 6 cm long, 1.5 to 4 cm wide, the base acute, the apex abruptly and shortly acuminate, or the acumen subcaudate and nearly 1 cm long; nerves 5 or 6 on each side of the midrib, not very prominent, scarcely anastomosing, the secondary ones indistinct, the ultimate veinlets forming a very dense, subfoveolate reticulation; petioles 5 to 10 mm long. Flowers unknown, the inflorescence from the upper axils, in fruit 3 to 5 cm long. Fruits globose or depressed-globose, black, about 8 mm in diameter, but one or two on each infrutescence, the calyx-segments deciduous, a disk-like portion remaining at the base of the fruit.

In the mossy forest, altitude about 2,300 m, *C. M. Z. 18054, 18080* (type). Locally known as *maschip*.

This species is well distinguished by its relatively broad leaves; it may ultimately have to be referred to *Persea*, as the calyx is not persistent. It seems, however, to have the other characters of *Machilus*, and is accordingly here placed in that genus.

CRUCIFERÆ.

CARDAMINE Linn.

1. **C. regeliana** Miq. Ann. Mus. Bot. Lugd.-Bat. **2** (1865) 73.

In stream depressions, pine region, altitude about 1,300 m, *C. M. Z. 16090*.

Eastern Asia and Japan, south to the Malay Archipelago; in the Philippines confined to the Benguet-Lepanto region.

NASTURTIUM R. Br.

1. **N. indicum** DC. Syst. Veg. **2** (1821) 199, Prodr. **1** (1824) 139.

Altitude not given, probably in the pine region, *C. M. Z. 16089*.

Widely distributed in the Philippines at low and medium altitudes; India to Japan and Malaya.

NEPENTHACEÆ.

NEPENTHES Linn.

1. **N. alata** Blanco Fl. Filip. (1837) 805.

In the pine region on open slopes, altitude about 1,400 m, *C. M. Z. 18188*, locally known as *cacalum*.

Widely distributed in the Philippines at medium and higher altitudes; endemic.

DROSERACEÆ.

DROSERA Linn.

1. **D. peltata** Sm. in Willd. Sp. Pl. **1** (1797) 1546.

Grassy slopes in the pine region, below 1,800 m altitude, *Merrill 6535*.

Widely distributed in the Benguet-Lepanto region; India to China and Japan, through Malaya to Australia and Tasmania.

CRASSULACEÆ.

BRYOPHYLLUM Salisb.

1. **B. pinnatum** (Lam.) Kurz in Journ. As. Soc. Beng. **40**[2] (1876) 309.

Habitat not given, probably in the lower pine region, *C. M. Z. 16234.*

Widely distributed in the Tropics of the world, presumably a native of Africa; common and widely distributed in the Philippines.

KALANCHOE Adans.

1. **K. spathulata** (Poir.) DC. Pl. Grass. *t. 65*, Prodr. **3** (1828) 395.

On dry rocks in open pine forests below 1,300 m, *C. M. Z. 16233, 16327.*

Widely distributed in the Philippines; India to southern China, Formosa, and Java.

SEDUM Linn.

1. **S. australe** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 16.

On boulders in stream depressions, lower pine region, altitude about 1,400 m, *C. M. Z. 16326, Merrill 6484.*

Endemic; confined to the Benguet-Lepanto region.

SAXIFRAGACEÆ.

ASTILBE Ham.

1. **A. philippinensis** Henry in Gard. Chron. (1902) **2:** 155.

Widely distributed in the pine region, *C. M. Z. 16072, Merrill 6574, McGregor 8903.*

Known only from the pine area of the Benguet-Lepanto region; allied to Asiatic species.

DEUTZIA Thunb.

1. **D. pulchra** Vid. Rev. Pl. Vasc. Filip. (1886) 124.

In the upper pine region, ravines, open slopes, etc., *C. M. Z. 18114, Merrill 6554.*

Known only from the mountains of the Benguet-Lepanto region, and from those of Zambales Province, Luzon; allied to Asiatic species.

HYDRANGEA Linn.

1. **H. lobbii** Maxim. in Mém. Acad. Pétersb. VII **10** (1867) 15.

Abundant and widely distributed in the mossy forest, *C. M. Z. 18058, 18060, 18078, Merrill 6587, McGregor 8830, 8831.*

Widely distributed on the mountains of Luzon; endemic.

ITEA Linn.

1. **I. macrophylla** Wall. in Roxb. Fl. Ind. **2** (1831) 419.

In stream depressions below an altitude of 1,500 m, *C. M. Z. 18175, 18209.*

Widely distributed in the Philippines at medium altitudes; mountains of India to southern China, and Java.

This is quite the same form that Mr. Elmer has recently described as *Itea luzonensis* (Leafl. Philip. Bot. **2** (1908) 528), but with the material at present available here for comparison, I can not discover sufficient reasons for specifically distinguishing the Philippine from the Asiatic plant.

POLYOSMA Blume.

1. **P. philippinensis** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 16.
In the mossy forest, altitude about 2,300 m, *C. M. Z. 18148*.
Widely distributed on the higher mountains of the Philippines; endemic.

PITTOSPORACEÆ.

PITTOSPORUM Banks.

1. **P. pentandrum** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) **27** (1905) 19.
In stream depressions below an altitude of 4,500 m, *C. M. Z. 18193, 18213*, locally known as *lasuit*.
Abundant and widely distributed in the Philippines at low and medium altitudes; endemic.

2. **P. resiniferum** Hemsl. in Kew Bull. (1894) 344.
In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18090, McGregor 8868*.
Widely distributed at higher altitudes in the Philippines, a characteristic species of the mossy forests of the higher mountains; endemic.

ROSACEÆ.

ROSA Linn.

1. **R. multiflora** Thunb. Fl. Jap. (1784) 214.
Stream depressions in the pine region, altitude about 1,500 m, *C. M. Z. 18168, Merrill 6532*.
Widely distributed and abundant in the Benguet-Lepanto region, but otherwise not known from the Philippines; Japan, southern China, and Formosa.

FRAGARIA Linn.

1. **F. indica** Andr. Bot. Rep. *t. 479*.
In the upper pine region, altitude about 2,100 m, *C. M. Z. 16174*.
Known in the Philippines only from the Benguet-Lepanto region; Afghanistan to the mountains of India and the Malay Archipelago, China, and Japan.

RUBUS Linn.

1. **R. copelandi** Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 194.
In the mossy forest, altitude about 2,500 m, *C. M. Z. 16328, Merrill 6560*.
Otherwise known only from a similar habitat at Pauai, across the Agno River from Mount Pulog.

2. **R. ellipticus** Sm. in Rees Cycl. **30**, no. 16.
In the upper pine region, extending into the lower limits of the mossy forest, *C. M. Z. 18156, Merrill 6562*.
Known in the Philippines only from high or medium altitudes in the Benguet-Lepanto region; mountains of India, Ceylon, Burma, and southern China.

3. **R. elmeri** Focke in Bibliotheca Botanica **72** (1909) 112.
In the upper pine region, *C. M. Z. 16171, 16172, Merrill 6542*.
This recently described species is widely distributed in the pine region in northern Luzon, and is also represented by the following specimens: District of Lepanto, trail to Balbalasan, *For. Bur. 5711 Klemme;* Mount Data, *Merrill 4651:* Province of Benguet, Pauai, *Bur. Sci. 4305 Mearns, Bur. Sci. 8337 McGregor;* Baguio, *Elmer 5792, Topping 127, For. Bur. 949 Barnes;* Mount Tonglon, *Bur. Sci. 5430 Ramos, For. Bur. 14161 Merritt;* without definite locality,

Mearns s. n., Loher 2244. It extends from an altitude of about 1,400 m to at least 2,200 m above the level of the sea; endemic.

4. **R. fraxinifolius** Poir. in Lam. Encycl. **6** (1804) 242.

In the upper pine region, *C. M. Z. 18155*, and in the mossy forest, *Merrill 6557*.

Widely distributed in the Philippines, extending from sea level to an altitude of about 2,250 m; widely distributed in Malaya. Doctor Focke writes that the Philippine material is all referable to the eastern subspecies *celebicus* (Bl.), which differs from the form found in the Sunda Islands in some respects.

5. **R. mearnsii** Elm. Leafl. Philip. Bot. **2** (1908) 448.

In the mossy forest, *C. M. Z. 16173, McGregor 8885*.

Known only from similar habitats and altitudes in Benguet Province.

6. **R. niveus** Thunb. Diss. Rub. (1815) 9.

In stream depressions, pine region, altitude about 1,500 m, *Merrill 6533*.

Known in the Philippines only from the Benguet-Lepanto region; India to Ceylon, China, and Malaya.

Doctor Focke writes that he can not distinguish from this species *Rubus horsfieldii* Miq. nor *R. lasiocarpus* Sm.

7. **R. pectinellus** Maxim. in Bull. Acad. Pétersb. **17** (1871) 147.

In the mossy forest, *Merrill 6565*.

Known in the Philippines only from high altitudes in the Benguet-Lepanto region, and also from Mount Apo, Mindanao; Japan.

8. **R. rolfei** Vid. Phan. Cuming. Philip. (1885) 171.

In the upper parts of the mossy forest, *Merrill 6602*.

Known only from high altitudes in Benguet, from Mount Banajao, Luzon, Mount Halcon, Mindoro, and from Mount Canlaon, Negros.

9. **R.** sp.

In the mossy forest, *Merrill 6500*.

A sterile specimen, representing possibly an undescribed species, as it is not matched by any of our other Philippine material.

PYGEUM Gaertn.

1. **P. glandulosum** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 226.

In stream depressions, lower pine region, *C. M. Z. 18212*.

Widely distributed in the Philippines at low and medium altitudes; endemic.

2. **P.** sp. ?

In the mossy forest, *C. M. Z. 18076*.

The specimen is sterile, and is hardly determinable; it may belong to some other genus, or even family.

LEGUMINOSÆ.

PITHECOLOBIUM Mart.

1. **P. subacutum** Benth. in Hook. Lond. Journ. Bot. **3** (1844) 210.

In the pine region below 1,500 m altitude, *C. M. Z. 18189*.

Widely distributed in the Philippines; Celebes.

INDIGOFERA L.

1. **I. nigrescens** Kurz ex Prain in Journ. As. Soc. Beng. **67** [2] (1898) 286.

In the pine region, ascending to 2,000 m altitude, *C. M. Z. 16225, Merrill 6395*.

Known in the Philippines only from the Benguet-Lepanto region; Khasia Mountains and southwestern China.

PAROSELA Cav.

1. **P. glandulosa** (Blanco) Merr. supra 68.
In the pine region, altitude 1,500 m, *C. M. Z. 16226.*
Introduced from Mexico, now abundant and widely distributed in Luzon.

DESMODIUM Desv.

1. **D. sinuatum** (Miq.) Bl. ex Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 166.
In the pine region, ascending to 2,000 m, *C. M. Z. 16034.*
Medium and higher altitudes in northern Luzon and in Mindanao; India to China, Formosa, Malaya to New Guinea.

2. **D. microphyllum** (Thunb.) DC. Prodr. **2** (1825) 337.
In grass lands, pine region, ascending to 2,000 m, *C. M. Z. 18153:* Philippine and extra-Philippine range as in the preceding species.

LOUREA Neck.

1. **L. reniformis** (Lour.) DC. Prodr. **2** (1825) 324.
In the pine region, altitude about 1,500 m, *C. M. Z. 16227.*
Known in the Philippines only from northern Luzon; Burma to China, Formosa, Malaya, and northern Australia.

PHYLACIUM Benn.

1. **P. bracteosum** Benn. Pl. Jav. Rar. (1840) 159, *t. 33.*
In stream depressions, pine region, ascending to 1,500 m altitude, *C. M. Z. 16222.*
Widely distributed in the Philippines, especially at low altitudes; Malay Peninsula and Archipelago to New Guinea.

SHUTERIA W. & A.

1. **S. vestita** W. & A. Prodr. (1834) 207.
In the pine region, ascending to 2,000 m, *C. M. Z. 16221.*
Known in the Philippines only from higher altitudes in the Benguet-Lepanto region; India and Ceylon to southern China.

CAJANUS DC.

1. **C. indicus** Spreng. Syst. **3** (1826) 248.
Stream depressions in the lower pine region, *C. M. Z. 16033.*
Cultivated by the Igorots, and locally known as *caldis;* widely distributed in the Philippines, frequently cultivated; Tropics of the world.

FLEMINGIA Roxb.

1. **F. cumingiana** Benth. Pl. Jungh. (1852) 245.
In the pine region, altitude 1,500 m, *C. M. Z. 16224.*
Endemic.

PHASEOLUS L.

1. **P. lunatus** L. Sp. Pl. (1753) 724.
In the lower pine region, *C. M. Z. 16220, 16223.*
Abundant and widely distributed in the Philippines, frequently cultivated; Tropics of the world.

OXALIDACEÆ.

OXALIS Linn.

1. **O. repens** Thunb. Oxal. (1781) 16; B. L. Robinson in Journ. Bot. 44 (1906) 391.

Altitude not given, *C. M. Z. 16096.*

Widely distributed in Europe, Asia, Africa, Malaya, and North America; confused by most authors with *O. corniculata* L.

RUTACEÆ.

EVODIA Forst.

1. **E. reticulata** Merr. in Philip. Journ. Sci. **2** (1907) 277.

In the mossy forest, altitude about 2,600 m, *C. M. Z. 18074.*

Previously known only from Mount Halcon, Mindoro.

2. **E. dubia** Merr. in Govt. Lab. Publ. **35** (1905) 23.

In the mossy forest, altitude about 2,400 m, *C. M. Z. 18088, McGregor 8857.*

Known only from similar habitats in the Benguet-Lepanto region.

MELICOPE Forst.

1. **M. luzonensis** Engl. ex Perk. Frag. Fl. Philip. (1905) 161.

Stream depressions in the pine region below an altitude of 1,500 m, *C. M. Z. 18180, 18211.*

Widely distributed in the Philippines at low and medium altitudes; endemic.

BOENNINGHAUSENIA Reichb.

1. **B. albiflora** (L.) Reichb. Consp. (1828) 197.

Widely distributed in the mossy forest above an altitude of 2,300 m, *C. M. Z. 16062, Merrill 6580, McGregor 8863.*

Known in the Philippines only from similar habitats on the higher mountains of the Benguet-Lepanto region; temperate Himalaya to China, Japan, and Formosa.

SKIMMIA Thunb.

1. **S. japonica** Thunb. Nov. Gen. (1783) 58.

In the mossy forest, altitude about 2,600 m, *C. M. Z. 18046, 18085.*

Known in the Philippines only from the higher mountains of the Benguet-Lepanto region; Himalayan region, China, Japan, and Formosa.

MELIACEÆ.

AGLAIA Lour.

1. **A. elliptifolia** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 413.?

In the pine region at an altitude of about 1,500 m, *C. M. Z. 18199,* locally known as *saybong.*

The specimen is sterile, but is apparently referable to the above species; previously known from the Batanes Islands.

EUPHORBIACEÆ.

PHYLLANTHUS Linn.

1. **P. benguetensis** C. B. Rob. in Philip. Journ. Sci. 4 (1909) Bot. 78.
On steep slopes, pine region, altitude about 1,400 m, *Merrill 6528.*
Known only from similar habitats in Benguet Province.
2. **P. reticulatus** Poir. in Lam. Encycl. 5 (1804) 298.
In the pine region, altitude about 1,300 m, *C. M. Z. 18181.*
Widely distributed in the Philippines at low and medium altitudes; tropical Asia and Africa, Malaya.
3. **P.** sp.
Stream depressions, pine region, altitude about 1,400 m, *C. M. Z. 16148.*
Apparently an undescribed form.

GLOCHIDION Forst.

1. **G. merrillii** C. B. Rob. in Philip. Journ. Sci. 4 (1909) Bot. 100.
In the upper pine region, altitude about 2,000 m, *C. M. Z. 18146,* and in the mossy forest, above an altitude of 2,500 m, *C. M. Z. 16147, 18122, 18133.*
Known only from similar habitats in Benguet Province.
2. **G. luzonense** Elmer Leafl. Philip. Bot. 1 (1908) 301.
On open grassy slopes, lower pine region, below an altitude of 1,500 m, *C. M. Z. 16075, 18190.*
Known only from low and medium altitudes in central and northern Luzon.

BREYNIA Forst.

1. **B. rhamnoides** (Retz.) Muell.-Arg. in DC. Prodr. 15² (1866) 440.
Stream depressions, pine region, altitude about 1,500 m, *C. M. Z. 18178.*
Widely distributed in the Philippines at low and medium altitudes; India to southern China, and Malaya.

BISCHOFIA Bl.

1. **B. javanica** Bl. Bijdr. (1826) 1168.
Stream depressions in the pine region, below an altitude of 1,300 m, *C. M. Z. 18214.*
Widely distributed in the Philippines at low and medium altitudes; India to southern China, Malaya, and Polynesia.
The oldest valid specific name for this plant is *Bischofia javanica* Bl. The publication of *Andrachne trifoliata* Roxb.=*Bischofia trifoliata* Hook., dates from the year 1832, the earlier use of the name by Roxburgh, Hort. Beng. (1814), being only as a *nomen nudum.*

BRIDELIA Willd.

1. **B.** sp.
In stream depressions, pine region, altitude about 1,400 m, *C. M. Z. 18195.*

DAPHNIPHYLLUM Bl.

1. **D. glaucescens** Bl. Bijdr. (1826) 1153.
Mossy forest, altitude above 2,200 m, *C. M. Z. 18151.*
This form is known in the Philippines only from the Benguet region, and I am not quite sure as to the specific identity of the Philippine form with Blume's species. *D. glaucescens* Bl. is supposed to extend from the mountains of India to Ceylon to Java, Korea, and Japan.

CLAOXYLON Juss.

1. **C. purpureum** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 204.
In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16151, 18092.*
Abundant and widely distributed in similar habitats in the Benguet-Lepanto region; endemic.

MALLOTUS Lour.

1. **M. ricinoides** (Pers.) Muell.-Arg. in DC. Prodr. 15² (1866) 963.
In stream depressions, altitude about 1,500 m, *C. M. Z. 18143.*
Widely distributed and abundant in the Philippines; Tenasserim to southern China, and Java.

MACARANGA Thouars.

1. **M. dipterocarpifolia** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 205.
Altitude not given, *C. M. Z. 16150.*
Known only from northern Luzon.

ACALYPHA Linn.

1. **A. stipulacea** Klotz. in Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1:416.
In stream depressions, below an altitude of 1,300 m, *C. M. Z. 18216, 18219.*
Widely distributed in the Philippines at low altitudes; Malaya, extending to the Fiji Islands.

2. **A. grandis** Muell.-Arg. var. **velutina** Muell.-Arg. in DC. Prodr. 15² (1866) 806.
Stream depressions, altitude about 1,400 m, *C. M. Z. 16149.*
The variety endemic, rather widely distributed in Luzon, the species in Malaya and Polynesia.

HOMALANTHUS Juss.

1. **H. alpinus** Elmer Leafl. Philip. Bot. 1 (1908) 307.
Stream depressions at an altitude of about 2,000 m, *C. M. Z. 18111.*
At higher altitudes on the mountains of Luzon; endemic.
2. **H. fastuosus** (Morren) F.-Vill. Nov. App. (1880) 196.
In the mossy forest, altitude about 2,600 m, *C. M. Z. 18042.*
Widely distributed in the Philippines; endemic.

CORIARIACEÆ.

CORIARIA Niss.

1. **C. intermedia** Matsum. in Bot. Mag. Tokyo 12 (1898) 62; Merr. in Philip. Journ. Sci. 1 (1908) Suppl. 205.
Stream depressions, pine region, altitude about 1,800 m, *Merrill 6526.*
Formosa.

ANACARDIACEÆ.

PISTACIA Linn.

1. **P. philippinensis** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 107.
Stream depressions below 1,100 m, *C. M. Z. 16076.*
A characteristic species of dry open slopes of stream depressions in Benguet, and at present known only from that Province. It is apparently closely allied to, and possibly identical with *Pistacia formosana* Matsum. Journ. Coll. Sci. Tokyo 22 (1906) 99, *pl. 9.* It is known to the Igorots as *sanguilo* or *sanguido,* and the wood is utilized by them for making tobacco pipes.

AQUIFOLIACEÆ.

ILEX Linn.

1. **I. crenata** Thunb. forma **luzonica** (Rolfe) Loes. Nov. Act. Acad. Nat. Cur. **78** (1901) 201.

Characteristic of the mossy forest above 2,250 m, *C. M. Z. 18040, 18109.*

Japan and the Riu Kiu Islands, the forma *luzonica* in Luzon, the var. *thompsonii* (Hook. f.) Loes. in the Himalayan region. Characteristic of the higher mountains of Luzon, as far south as Mount Banajao; also on Mount Canlaon, Negros.

2. **I. gracilipes** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 237.

Pine region below 1,700 m, *C. M. Z. 18160.*

Endemic.

3. **I.** sp.

Mossy forest, above 2,250 m, *C. M. Z. 18069.*

Apparently allied to *I. crenata,* and perhaps only a form of that species; specimen in fruit only.

4. **Ilex pulogensis** Merrill sp. nov. *Thyrsoprinus, Indico-Malaicae.*

Frutex vel arbor glaber, erectus; foliis elliptico-ovatis, usque ad 5 cm longis, crasse coriaceis, nitidis, apice acuminatis, basi cuneatis, nervis utrinque 5 ad 7; racemis axillaribus, solitariis, brevibus; floribus 5-meris.

An erect or parasitic shrub or tree 4 to 20 m in height, glabrous throughout. Branches terete, light-gray, shining, the branchlets dark-brown to nearly black, somewhat lenticellate. Leaves elliptic-ovate, 2.5 to 5 cm long, 1 to 2 cm wide, thickly coriaceous, shining and of the same color on both surfaces when dry, not punctate or glandular, the base cuneate, the apex acuminate; nerves 5 to 7 on each side of the midrib, not distinct, obscurely anastomosing, the secondary reticulations obsolete, the midrib slightly impressed on the upper surface, beneath prominent; petioles about 5 mm long. Racemes axillary, simple, solitary, 8 to 12 mm long, with from 8 to 15 flowers, the bracteoles ovate, acute, 1 mm long, the pedicels 1 to 2 mm long. Flowers small, 5-merous, the sepals elliptic-ovate, rounded, about 1 mm long, imbricate. Petals about as long as the sepals. Anthers 1 mm long. Ovary 5-celled. Fruit globose, 3 to 3.5 mm in diameter, 5-celled.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18099, 18145* (type), also represented by *Williams 1547* from Mount Santo Tomas, at a similar altitude and in a similar habitat. Merritt notes on the field label of no. 18145 that the species has a "balete" habit, that is, parasitic, similar to most species of *Ficus* of the section *Urostigma.*

Apparently most closely allied to *Ilex spicata* Blume of Java, Sumatra, and New Guinea, but distinguished at once by its 5-merous flowers.

Very similar to **Ilex halconensis** (Merr.) comb. nov. (*Embelia halconensis* Merr. in Philip. Journ. Sci. **2** (1907) Bot. 297), differing in its shorter racemes and somewhat smaller leaves, which are not punctate beneath. *Ilex halconensis,* known at present only from Mindoro, was erroneously ascribed by me to *Embelia.* of the *Myrsinaceae,* being placed with doubt in the § *Pattara.* It is, however, a true *Ilex,* and is here transferred to its proper genus.

CELASTRACEÆ.

PERROTTETIA H. B. K.

1. **P. alpestris** Loesen. var. **philippinensis** (Vid.) Stapf in Trans. Linn. Soc. Bot. 4 (1894) 141.

Caryospermum philippinense Vid. Rev. Pl. Vasc. Filip. (1886) 89.

Mossy forest, altitude 2,250 m, *C. M. Z. 18094, McGregor 8865.*

The variety widely distributed on the higher Philippine mountains, and also found on Mount Kinabalu, Borneo; the species widely distributed in Malaya.

STAPHYLEACEÆ.

TURPINIA Vent.

1. **T. pomifera** (Roxb.) DC. Prodr. **2** (1825) 3.

In stream depressions, pine region altitude about 1,500 m, *C. M. Z. 18194, 18201.*

Widely distributed in the Philippines at low and medium altitudes; India to southern China and Formosa to Malaya.

SAPINDACEÆ.

GUIOA Cav.

1. **G. perrottetii** (Bl.) Radlk. in Sitzb. Math.-Phys. Acad. Muench. **8** (1878) 302.

In stream depressions below an altitude of 1,300 m, *C. M. Z. 18208, 18221.*

Widely distributed in the Philippines at low and medium altitudes; endemic.

SABIACEÆ.

MELIOSMA Blume.

1. **M. multiflora** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 25.

Lower parts of the mossy forest, extending into ravines in the upper pine region, as low as 2,000 m, *C. M. Z. 18118, 18142, 18128, 18134,* locally known to the Igorots as *adopo.*

Known only from the mountains of northern and central Luzon.

RHAMNACEÆ.

SAGERETIA Brongn.

1. **S. theezans** (Linn.) Brongn. in Ann. Sci. Nat. I **10** (1827) 360.

In stream depressions, pine region, altitude below 1,500 m, *C. M. Z. 16235, 18169.*

In the Philippines known only from the Benguet-Lepanto region, the mountains of Ilocos Sur and Zambales; Baluchistan to India, southern China, and Formosa.

RHAMNUS Linn.

1. **Rhamnus pulogensis** Merrill sp. nov. § *Eurhamnus, Cervispina.*

Frutex erectus, 3 ad 4 m altus, partibus junioribus exceptis glaber; foliis elliptico-ovatis, usque ad 1.5 cm longis, subcoriaceis, acuminatis, crenatis, crenulis in foliis junioribus valde glandulosis; floribus axillaribus, fasciculatis, pedicellatis, tetrameris, ovario biloculare.

An erect, much-branched shrub 3 to 4 m high, glabrous except the branchlets and young leaves which are somewhat pubescent. Branches stout, terete, yellowish- or grayish-brown, the branchlets puberulent, slender, most of them terminated by a short, 1 to 2 mm long spine. Leaves alternate, mostly somewhat crowded, elliptic-ovate, coriaceous, 1 to 1.5 cm long, 5 to 10 mm wide, acuminate, base acute, margins rather densely crenulate, each tooth, in young leaves, bearing a small, oblong, brownish gland, which is early deciduous; nerves 2 to 4 on each side of the midrib, ascending, distinct beneath, the reticulations also very distinct on the lower surface; petioles 3 to 5 mm long; stipules acicular, about 2 mm long. Flowers axillary, fascicled, the pistillate ones 4-merous, their pedicels 2.5 to 4 mm long. Calyx 2.5 to 3 mm long, the lobes narrowly ovate, somewhat acuminate, about 2 mm long, 1 mm wide, slightly recurved, obscurely keeled within. Petals none. Ovary ovoid, glabrous, 2-celled; style 1 mm long, cleft, the arms 0.5 mm long, recurved. Staminate flowers unknown. Fruit ellipsoid or narrowly obovoid, black and shining when dry, blue when fresh, about 6 mm long (immature), the persistent calyx-base 2.5 to 3 mm in diameter.

In the mossy forest, altitude about 2,400 m, *For. Bur. 18102 Curran, Merritt, & Zschokke*, January 6, 1909.

A species allied to the Asiatic *Rhamnus virgatus* Roxb., and *R. dahuricus* Pall., and to the Japanese *R. japonicus* Maxim., but apparently sufficiently distinct from all described forms of these.

VITACEÆ.

AMPELOPSIS Michx.

1. **A. heterophylla** (Thunb.) Sieb. & Zucc. Abhandl. Akad. Muench. 4² (1846) 196.

In stream depressions below an altitude of 1,500 m, *C. M. Z. 16236, Merrill 6393.*

Rather widely distributed in Luzon; India to southern China and Japan. The specimens cited above belong to the variety *hancei* Planch.

TETRASTIGMA Planch.

1. **T. angustifolium** (Roxb.) Planch. in DC. Monog. Phan. 5 (1887) 439 ?

With the preceding, *Merrill 6394.*

This species seems to be imperfectly known, but the specimen cited above apparently agrees closely with the plate in Wight's "Icones" cited by Planchon. This form is widely distributed in the Philippines; Sumatra.

TILIACEÆ.

TRIUMFETTA Linn.

1. **T. pilosa** Roth Nov. Sp. Pl. (1821) 233.

In the pine region, altitude about 1,500 m, *C. M. Z. 16100.*

Luzon and Mindanao at medium altitudes; India to the Malay Peninsula, and Africa.

GREWIA Linn.

1. **G.** sp.

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 18124*. The specimen is sterile, and Mr. Merritt notes that the bark is used by the Igorots for making string and rope; locally known as *arinao*.

MALVACEÆ.

SIDA L.

1. **S. rhombifolia** L. Sp. Pl. (1753) 684.

In stream depressions below an altitude of 1,500 m, *C. M. Z. 16238*.

Abundant and widely distributed in the Philippines; cosmopolitan in the tropical and subtropical regions of both hemispheres.

DILLENIACEÆ.

SAURAUIA Willd.

1. **S. elegans** (Choisy) F.-Vill. Nov. App. (180) 19.

Ravines in the pine region below 1,700 m altitude, *C. M. Z. 18166*.

Common at medium altitudes in the Benguet-Lepanto region, and on mountains to the south; endemic.

THEACEÆ.

EURYA Thunb.

1. **Eurya coriacea** Merrill sp. nov.

Arbuscula vel arbor glabra 2 ad 8 m alta; foliis ovato-ellipticis, crassissime coriaceis, nitidis, in siccitate plus minus aurantiacis, late brevissime acuminatis, acuminibus retusis, margine prominente glanduloso-denticulatis; floribus pro genere magnis, 1.3 cm diametro, axillaribus, solitariis, sepalis petalisque retusis.

A shrub or tree 2 to 8 m high, glabrous throughout, even to the ultimate branchlets. Branches terete, reddish-brown or grayish, rather stout. Leaves rather crowded, very thickly coriaceous, ovate-elliptic, 4 to 6 cm long, 1.6 to 3.4 cm wide, yellowish and shining when dry, the base rounded or acute, the apex very shortly and broadly acuminate, the acumen retuse, the margins rather prominently and regularly glandular-denticulate; nerves about 10 on each side of the midrib, anastomosing, the reticulations and secondary nerves nearly as prominent as the primary ones; petioles stout, about 2 mm long. Flowers white, axillary, solitary, 1.3 cm in diameter, the peduncles stout, 3 mm long or less. Sepals orbicular, retuse, entirely glabrous except for the ciliate margins, coriaceous, about 5 mm in diameter. Corolla-lobes obovate, retuse, about 8 mm long, 6 mm wide, thick, glabrous. Stamens 13, the filaments 2.5 to 3 mm long; anthers elliptic, obtuse, about 1.7 mm long. Pistillate flowers unknown.

In the mossy forest above an altitude of 2,300 m, *For. Bur. 18108* (type), *18047 Curran, Merritt, & Zschokke*, January 6, 1909.

A species apparently allied to *Eurya macartneyi* Champ. of Hongkong, but well characterized by its comparatively large flowers. In the latter character it is similar to *E. amplexicaulis* Moore (*E. auriculata* Elm.) of Mindoro and Negros, but the leaves of Moore's species are very different.

I am disposed to refer to this species two other specimens from the same locality and habitat, *C. M. Z. 18052*, with fruits about 3 mm in diameter, showing three, sometimes four, persistent styles, free to the base, and *C. M. Z. 18066*, like *18052*, but with much smaller leaves which are ovate or orbicular-ovate and 2 cm long or less.

2. **Eurya buxifolia** Merrill sp. nov.

Arbuscula vel arbor 2 ad 5.5 m alta, ramulis exceptis glabra; foliis parvis, ellipticis vel elliptico-ovatis, late brevissime acuminatis, 1 ad 2.5 cm longis, nitidis, junioribus subtus ad costam plus minus adpresse pubescentibus; floribus parvis, axillaribus, solitariis vel binis, 5 ad 6 mm diametro, sepalis rotundatis vel acutis.

A shrub or tree 2 to 5.5 m high, glabrous except the young branchlets and young leaves. Branches terete, brown or gray, the young branchlets slender, more or less hirsute with short, often appressed hairs. Leaves somewhat crowded, very numerous, somewhat distichous, elliptic or elliptic-ovate, coriaceous, 1 to 2.5 cm long, 0.6 to 1.5 cm wide, shining or somewhat dull when dry, pale-green or somewhat yellowish, glabrous, the younger ones appressed-pubescent on the midrib beneath, the base rounded or acute, the apex very shortly and broadly acuminate, rarely nearly acute, the acumen retuse, the margins distinctly and regularly glandular-denticulate; nerves about 7 on each side of the midrib, rather distinct beneath, anastomosing; petioles about 1 mm long. Staminate flowers axillary, white, solitary or in pairs, often nodding, 5 to 6 mm in diameter, their pedicels about 2 mm long, the bracteoles ovate, less than 1 mm in length. Sepals glabrous, or the outer ones sometimes slightly pubescent, retuse, the inner ones elliptic or broadly elliptic, 2.2 mm long, the outer somewhat smaller and rounded or ovate. Corolla-tube short, the lobes elliptic-ovate or elliptic, rounded or retuse, about 4 mm long, 2.5 to 2.8 mm wide. Stamens 7; filaments about 2 mm long; anthers 1.5 mm long, apiculate. Pistillate flowers similar to the staminate ones; ovary ovoid or globose; style 1.5 mm long, 3-cleft at the apex, the arms about 0.6 mm long. Fruit globose, 3 mm in diameter, tipped by the remains of the style; seeds many, compressed, about 1.5 mm long.

Widely distributed in the mossy forest, *For. Bur. 16170, 18064* (type), *18044, 18129 Curran, Merritt, & Zschokke*, and also represented by the following specimens, all from similar habitats: District of Lepanto, Sagada, *For. Bur. 5674 Klemme;* Mount Data, *Merrill 4527:* Province of Benguet, Pauai, *For. Bur. 14445 Darling;* Mount Ugo, *Bur. Sci. 5834 Ramos;* Mount Tonglon, *For. Bur. 14154, 14165 Merritt.*

The same species is apparently represented by a Formosan specimen (sterile)

distributed from the Botanical Institute, Tokyo, as *Eurya japonica* Thunb., under the number 1369.

A species characterized by its small leaves and apparently sufficiently constant to warrant description as a distinct form. It is allied to *Eurya acuminata* DC., and to *E. japonica* Thunb., differing from both in its leaf-characters, and from the latter in its pubescent branchlets.

ADINANDRA Jack.

Adinandra montana Merrill sp. nov.

Arbor glabra 4 ad 10 m alta; foliis coriaceis elliptico-ovatis vel elliptico-oblongis, integris, nitidis, apice breviter acuminatis, acuminibus obtusis vel retusis, nervis in pagina inferiore subobsoletis, superiore tenuibus; floribus axillaribus, sepalis petalisque ad marginem ciliatis.

A glabrous tree 4 to 10 m high. Branches terete, grayish-brown, the ultimate branchlets reddish-brown and faintly angled. Leaves alternate, elliptic-ovate to elliptic-oblong, entire, thickly coriaceous, 5 to 8 cm long, 2 to 3.5 cm wide, brownish and somewhat shining when dry, the base acute, the apex usually more or less acuminate, often very shortly and broadly so, or almost rounded, the acumen blunt or somewhat retuse; nerves subobsolete on the lower surface, on the upper surface faint, about 10 on each side of the midrib; petioles 5 to 8 mm long. Flowers axillary, mostly solitary, white, often nodding, the pedicels stout, 1 to 1.5 cm long. Sepals broadly ovate, abruptly apiculate, 3 mm long, the margins ciliate. Petals obovate or narrowly obovate, in anthesis 12 mm long, rounded or somewhat retuse, the margins ciliate. Stamens about 30; filaments 7 mm long or less; anthers basifixed, 1.8 to 2 mm long, with few, scattered, rather stiff, white hairs. Ovary glabrous, 5-celled, each cell with many ovules; style about 9 mm long. Fruit ovoid, glabrous, somewhat fleshy, about 1.3 cm long, brown, shining; seeds brown, shining, irregularly compressed, about 3 mm long, minutely pitted.

The type of this species is *For. Bur. 4558 Mearns & Hutchinson*, from Mount Malanding, Mindanao, but I am unable to distinguish from it by any valid characters *For. Bur. 18149 Curran, Merritt, & Zschokke*, from the lower parts of the mossy forest on Mount Pulog. The same species is also apparently represented by *Bur. Sci. 4414, 4420 Mearns*, Pauai, Province of Benguet, Luzon. A specimen from Mount Malaraya, Tayabas Province, differs in having smaller fruits and shorter pedicels, while two specimens from Mount Halcon, Mindoro, *For. Bur. 4410, 4453 Merritt*, have some of the leaves larger (reaching a length of 10 cm), with the nerves distinctly visible on the lower surface. It is possible that all these specimens are referable to a single species, but it is more probable that additional material will show sufficiently constant characters to warrant the separation of several closely allied forms.

The species is manifestly closely allied to *Adinandra dumosa* Jack, of the Malay Peninsula and Archipelago, but evident distinguishing characters are the smaller leaves, with the nerves at least visible on the upper surface in the present form.

GUTTIFERÆ.

HYPERICUM Linn.

1. **H. japonicum** Thunb. Fl. Jap. (1784) 295, *pl. 31;* Lév. in Bull. Soc. Bot. France IV 7 (1908) 591.

Habitat not given, probably in the upper pine region, *McGregor 8884.*

Common in the Benguet-Lepanto region, and occasional at medium and higher altitudes southward; Japan to eastern India southward to Australia and New Zealand.

2. **Hypericum pulogense** Merrill sp. nov.

Herba suffruticosa, erecta, glabra, 20 ad 40 cm alta; foliis sessilibus, ellipticis vel oblongo-ellipticis, 1 ad 2 cm longis, obtusis, subtus subglaucescentibus, glandulosis; floribus 2.5 ad 3 cm diametro; capsulis trilocellatis; styli 3.

An erect, glabrous, suffrutescent herb 20 to 40 cm high. Stems slender, terete, firm, reddish or yellowish, smooth, 1 to 1.5 mm in diameter, with two longitudinal lines along the internodes between each two pairs of leaves. Leaves chartaceous to subcoriaceous, elliptic to oblong-elliptic, 1 to 2 cm long, 3.5 to 7 cm wide, obtuse, sometimes slightly retuse, sessile but not connate, slightly glaucous and strongly glandular beneath; nerves slender, ascending, obscurely anastomosing. Flowers yellow, solitary in the upper axils, or in 3-flowered corymbs, 2.5 to 3 cm in diameter. Sepals oblong or elliptic-oblong, 6.5 mm long, 2.2 to 2.7 mm wide, glabrous, obtuse, coriaceous, the upper half distinctly glandular. Petals narrowly oblong-obovate, inequilateral, 14 mm long, 5 to 6 mm wide, sparingly punctate-glandular on the upper half and near the borders, rounded. Stamens in five phalanges. Ovary narrowly ovoid, 4 mm long, 3-celled; styles 3, free throughout, 5 mm long. Capsule 5 to 6 mm long, narrowly oblong-ovoid, 3-celled; seeds oblong-elliptic, 1 mm long.

Abundant in the open grass lands of the summit, and also in open places in the mossy forest, *C. M. Z. 16097, Merrill 6577, McGregor 8875, 8880.*

The third species of the genus to be found in the Philippines, and apparently most closely allied to *Hypericum perforatum* Linn., which extends from Europe and northern Africa to northwestern India and northern and central China, introduced in North America.

VIOLACEÆ.

VIOLA Linn.

1. **V. toppingii** Elm. Leafl. Philip. Bot. 2 (1908) 505.

In the mossy forest, *C. M. Z. 16063bis, 16219, Merrill 6503,* and in ravines in the summit grass lands, *Merrill 6493.*

Widely distributed at high altitudes in the Benguet-Lepanto region, and rather variable. As *Viola serpens* Wall. is construed in Hooker's "Flora of British India," it seems to me that it would include this Philippine form. *V. toppingii* is represented also by the following specimens: District of Lepanto, Mount Data, *Merrill 4509, 4565:* Province of Benguet, Pauai, *Merrill 4769, Bur. Sci. 4363, 4388 Mearns;* Baguio, *Topping 119, Elmer 6042.*

BEGONIACEÆ.

BEGONIA Linn.

1. **Begonia merrittii** Merrill sp. nov. § *Petermannia.*

Herbacea vel suffruticosa, erecta vel subscandens, usque ad 2 m alta, glabra; foliis breviter petiolatis, inaequilateraliter lanceolato-ovatis vel oblongo-lanceolatis, 5 ad 7 cm longis, oblique subcordatis, lobo inferiore multo ampliore, rotundato, margine varie dentatis vel dentato-sublobatis, parce subulato-denticulatis, subtus sub lente minute densissime albido-punctatis, glabris; pedunculis folio brevioribus, dichotomis; floribus masculinis 3 ad 3.5 cm diametro; capsulis truncatis, aequaliter trialatis, 2 ad 2.5 cm latis.

Herbaceous or suffrutescent, erect or subscandent, 1 to 2 m high, branched. Stems reddish-brown when dry, terete, glabrous, the ultimate branchlets slender. Leaves inequilaterally lanceolate-ovate to oblong-lanceolate, 5 to 7 cm long, usually less than 3 cm wide, chartaceous, usually brownish when dry, not shining, paler beneath, glabrous, the lower surface under the lens minutely, densely, and obscurely white-punctate, base strongly inequilateral, obliquely subcordate, the lower lobe rounded, broad, the upper narrow, acute, the apex prominently subcaudate-acuminate, the margins variously dentate or dentate-sublobed, somewhat subulate-denticulate; nerves prominent, the reticulations subobsolete; petioles 5 to 10 mm long; stipules membranaceous, oblong-lanceolate, long and slenderly acuminate, 1 to 1.5 cm long, caducous. Male inflorescence once or twice dichotomous, the peduncle 1 to 2 cm long, the pedicels slender, 1 to 2 cm long, usually somewhat accrescent in fruit. Flowers 3 to 3.5 cm in diameter, pink, the sepals 2, orbicular, petals none. Pistillate flowers about as large as the staminate ones, the lobes much narrower than the sepals of the staminate flowers. Capsule 1.5 cm long, the apex truncate, including the wings 2 to 2.5 cm wide, the base acute.

In the mossy forest above 2,250 m, *C. M. Z. 16176, Merrill 6502.* The species is also well represented by a large series of specimens from the higher mountains of northern Luzon, as follows: District of Lepanto, *For. Bur. 14491 Darling:* Province of Benguet, Mount Ugo, *Bur. Sci. 5839 Ramos;* Pauai, *Bur. Sci. 4385 Mearns, Merrill 4781, Bur. Sci. 8496 McGregor;* Mount Lusod, *For. Bur. 15736 Merritt & Curran;* Mount Tonglon (Santo Tomas), *Elmer 6254* (type), *Bur. Sci. 5455 Ramos, Merrill 4823, Williams 1211, For. Bur. 11107 Whitford, For. Bur. 4996 Curran.* All the numbers cited are from the mossy forest above the altitudinal distribution of *Pinus insularis* Endl., and the species is absolutely confined to the wet mossy forest.

The species is somewhat variable, but is manifestly allied to *Begonia cumingiana* A. DC., and to *B. philippinensis,* recognizable at once by its smaller, relatively narrower, and quite glabrous leaves.

2. **B. manillensis** A. DC. in DC. Prodr. 15 [1] (1864) 323.

Grassy slopes, altitude about 1,800 m, *C. M. Z. 16175,* Igorot, *sasabang.*

Endemic; known only from Luzon.

THYMELAEACEÆ.

DAPHNE Tourn.

1. **D. luzonica** C. B. Rob. in Bull. Torr. Bot. Club. **35** (1908) 72, 75.

Rather abundant along the upper borders of the mossy forest, *C. M. Z. 18072, Merrill 6487, McGregor 8852.*

Known only from high altitudes in the Benguet-Lepanto region, a closely allied form in Yunnan. It is represented also by the following specimens: Mount Ugo, *Bur. Sci. 5783 Ramos;* Mount Tonglon, *Bur. Sci. 5385 Ramos, For. Bur. 5047 Curran,* and Benguet Province, without locality, *Loher 4483.*

WIKSTROEMIA Endl.

1. **W. lanceolata** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 31.
In the pine region, altitude about 1,500 m, *C. M. Z. 16164.*
Rather widely distributed in Luzon, mostly at medium altitudes.

ELAEAGNACEÆ.

ELAEAGNUS Linn.

1. **E. philippensis** Perr. in Mém. Linn. Soc. Paris **3** (1824) 114.
Pine region, altitude about 1,250 m, *C. M. Z. 18187.*
Widely distributed in the Philippines; endemic.

MYRTACEÆ.

LEPTOSPERMUM Forst.

1. **L. flavescens** Sm. in Trans. Linn. Soc. **3** (1797) 262; C. B. Rob. in Philip. Journ. Sci. 4 (1909) Bot. 335.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18051.*

Widely distributed on the higher mountains of the Philippines; Burma, through Malaya to tropical Australia and New Zealand.

PSIDIUM Linn.

1. **P. guajava** Linn. Sp. Pl. (1753) 470; C. B. Rob. l. c. 336.

In the pine region, ascending to an altitude of about 1,800 m, *C. M. Z. 18161.*

Abundant and widely distributed in the Philippines; introduced from tropical America, and now cosmopolitan in the Tropics.

DECASPERMUM Forst.

1. **D. paniculatum** (Lindl.) Kurz in Journ. As. Soc. Beng. **46**[2] (1877) 61; C. B. Rob. l. c. 337.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18101.*

Widely distributed in the Philippines, more especially at low and medium altitudes; Bengal to Formosa southward through Malaya to Australia.

EUGENIA Linn.

1. **E. acrophila** C. B. Rob. in Philip. Journ. Sci. 4 (1909) Bot. 389.
In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18036, 18068.*
Otherwise known only from Mount Tapulao, Province of Zambales, Luzon.

MELASTOMATACEÆ.

OSBECKIA L.

1. **O. chinensis** L. Sp. Pl. (1753) 490.

Common in the pine region below an altitude of 1,800 m, *C. M. Z. 16168, 16329.*

Widely distributed in the Philippines, from sea level to medium and higher altitudes; India to Japan southward to New Guinea and tropical Australia.

MELASTOMA L.

1. **M. toppingii** Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 38.

In the pine region, below an altitude of 1,800 m, *C. M. Z. 18167.*

Known only from the Benguet-Lepanto region, and represented by the type, *Topping 17,* from Baguio, also *Williams 1041* from the same locality, and by *For. Bur. 14482 Darling* from Mount Malaya, Lepanto. In some respects the species closely approaches the genus *Otanthera,* but the connective being produced from 1 to 1.5 mm, it is considered best to retain the species in *Melastoma,* even though there is no great difference in the length of the stamens. The species is well characterized by its stellately or fasciculately arranged calyx-setae, the fascicles being subsessile or shortly pedicelled. The species belongs apparently in section III of the genus in Cogniaux's monograph.

2. **Melastoma bensonii** Merrill sp. nov.

Frutex 1 ad 2 m altus, omnibus partibus plus minus setoso-strigosus; foliis 5- vel 7-nerviis, ovatis vel elliptico-ovatis, acutis vel obscure acuminatis, subtus pulcherrime et valde reticulatis; floribus pentameris, staminibus inaequalibus, antheris oblongis, majorum connectivis basi breviter (2.5 ad 3 mm) productis, antice bicalcaratis, minorum connectivis basi vix productis.

An erect, much branched shrub 1 to 2 m high. Branches brown, terete, the older ones glabrescent, the younger ones densely covered with slender, subappressed or ascending, subulate setae. Leaves coriaceous, ovate to elliptic-ovate, 4 to 9 cm long, 1.5 to 4.5 cm wide, the base rounded or somewhat acute, the apex acute or slightly acuminate, both surfaces with numerous slender, somewhat spreading, curved, subulate, 1 to 3 mm long setae; nerves 5 or 7, distinct, the reticulations beneath prominent, the ultimate ones olivaceous or blackish; petioles 5 to 18 mm long. Flowers 5-merous, pink, crowded in the uppermost axils or terminating the branchlets, their pedicels 3 to 4 mm long. Calyx about 8 mm long, densely covered with somewhat curved and spreading, subulate setae similar to those on other parts of the plant, the calyx-teeth about 3 mm long, ovate-lanceolate, acuminate, setose; bracteoles ovate to ovate-lanceolate, acuminate, setose, about 4 mm long. Petals obovate, slightly inequilateral, about 18 mm long, 11 mm wide, margins ciliate-setose, rounded. The five longer stamens 9 to 10 mm in length, their anthers oblong, 4 mm long, the connective produced 2.5 to 3 mm,

and with two 1.5 mm long spurs in front, the five shorter ones 6 mm long, their anthers 3 mm long, the connective not produced, with two large tubercles in front.

In the mossy forest, *C. M. Z. 18103.* The following material is also referable here, all from the Benguet-Lepanto region: near Suyoc, mossy forest, altitude 2,000 m, *For. Bur. 14456 Darling;* Pauai, *Bur. Sci. 4428 Mearns,* altitude at least 2,000 m; Mount Tonglon (Santo Tomas), *Elmer 6252* (type), *Williams 1210,* altitude above 2,000 m, mossy forest.

This species, like the preceding, is apparently referable to section III of the genus as defined in Cogniaux's monograph of the family; it has been confused with *M. toppingii* Merr., but is quite different from that species. Named in honor of Mr. Charles Benson who made the first ascent of Mount Pulog.

SARCOPYRAMIS Wall.

1. **S. delicata** C. B. Rob. in Bull. Torr. Bot. Club. **35** (1908), 72, 75.

Common in the mossy forest, *Merrill 6497, McGregor 8855, C. M. Z. 16449,* also at the base of ledges in the summit grass lands, *C. M. Z. 16167.*

Widely distributed on the higher mountains of Luzon, and also known from Mount Halcon, Mindoro, and Mount Apo, Mindanao; mountains of Formosa.

MEDINILLA Gaudich.

1. **M. cordata** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 37.

Abundant in the mossy forest, *C. M. Z. 18095, Merrill 6578, McGregor 8862.*

Common and widely distributed at higher altitudes in the Benguet-Lepanto region; endemic.

2. **Medinilla pulogensis** Merrill sp. nov.

Frutex, partibus junioribus exceptis glaber, 3 ad 4 m altus; ramis ramulisque griseis, teretibus, novellis plus minus furfuraceis; foliis oblongo-obovatis vel oblongo-ellipticis, oppositis, 5-plinerviis, petiolo usque ad 1.5 cm longo; floribus 6-meris, terminalibus, calycis dentibus brevibus.

A glabrous shrub, the young parts excepted, 3 to 4 m high. Branches and branchlets gray, terete, the youngest branchlets and leaves somewhat furfuraceous, soon becoming quite glabrous. Leaves opposite, oblong-obovate to oblong-elliptic, coriaceous, somewhat shining, 4 to 6 cm long, 1.5 cm to 3 cm wide, rounded or obtuse, rarely broadly and obscurely acuminate, base gradually narrowed, acute or acuminate-decurrent; nerves 5, the outer pair much fainter than the inner three; petioles 1 to 1.5 cm long. Flowers 6-merous, usually in threes at the apices of the branchlets, the calyx (in bud) cup-shaped, truncate, about 5 mm long, with 5 minute, obscure teeth, the pedicels 3 to 6 mm long.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18105.*

Manifestly very closely allied to *Medinilla whitfordii* Merr. (*Carionia triplinervia* Rolfe), differing from that species chiefly in its much longer petioles.

ONAGRACEÆ.

EPILOBIUM Linn.

1. **E. philippinense** C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 209.

In the upper pine region, altitude about 2,000 m, *C. M. Z. 16241, Merrill 6524.*

Known only from the Benguet-Lepanto region; apparently closely allied to *Epilobium himalayense* Haussk. of India and southern China.

HALORRHAGACEÆ.

HALORRHAGIS Forst.

1. **H. micrantha** (Thunb.) R. Br. ex Sieb. & Zucc. Fl. Jap. Nat. 1 (1843) 25.

Forming a dense mat in the Igorot footpath through the summit grass lands, *Merrill 6591, McGregor 8841.*

On the higher mountains of the Philippines; Himalayan region to China and Japan, Malaya, Australia, Tasmania, and New Zealand.

ARALIACEÆ.

ARALIA Linn.

1. **A. hypoleuca** Presl Epim. Bot. (1851) 250.

In the mossy forest above 2,250 m, *C. M. Z. 18135,* also in gorges in the pine region at about 2,000 m, *C. M. Z. 18112.*

Higher mountains of Luzon. Forbes and Hemsley reduce this to *A. spinosa* Linn., giving the range of that species as Eastern Asia and Japan, and North America, from Canada to Texas.

SCHEFFLERA Forst.

1. **S. caudata** (Vid.) Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 118.

Stream depressions in the pine region below 1,200 m, *C. M. Z. 16331.*

The specimen has very young flowers, and like most of our material from the Benguet region, differs slightly from the type; I have, however, detected no specific differences. Rather widely distributed in the Philippines at medium altitudes; endemic.

2. **S. luzoniensis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 218.

Mossy forest above 2,250 m, *C. M. Z. 18100;* previously known only from Mount Banajao, Luzon.

3. **S. microphylla** Merr. l. c.

Mossy forest above 2,250 m, *C. M. Z. 18088, Merrill 6564;* known only from the higher mountains of Abra, Lepanto, and Benguet.

4. **S. blancoi** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 109.

In stream depressions of the pine region below 1,300 m, *C. M. Z. 18207;* a sterile specimen from mossy forest, above 2,250 m, may be the same, *C. M. Z. 18081.*

Medium and higher altitudes on the mountains of Luzon; endemic.

5. **Schefflera oblongifolia** Merrill sp. nov. § *Cephaloschefflera.*

Arbuscula vel arbor 4 ad 15 m alta, partibus junioribus exceptis glabra; foliis longe petiolatis, foliolis 10 ad 12, oblongis, crasse coriaceis,

apice breviter acuminatis, basi rotundatis vel subcordatis, usque ad 23 cm longis; floribus 5- vel 6-meris, in capitulis globosis dispositis, ebracteolatis; capitulis circiter 1 cm diametro, racemose dispositis.

A shrub or tree 4 to 15 m high, glabrous, except the very young leaves and growing tips of the branches which are densely furfuraceous-pubescent. Branches light-gray, thickened. Petioles 30 to 50 cm long; stipules very thickly coriaceous, almost woody, about 4 cm long; leaflets digitate, 11 or 12, very thickly coriaceous, usually brownish-yellow when dry, oblong, 18 to 23 cm long, 5 to 9 cm wide, shining, the apex acuminate, the base rounded or subcordate; primary nerves about 12, rather distinct, anastomosing, the secondary ones often distinct; petiolules 6 to 11 cm long. Flowers in dense globose heads, ebracteolate, 5- or 6-merous. Heads 20 to 40 in each raceme, in fruit reddish or purplish, about 1 cm in diameter, glabrous, their peduncles 1 to 3 cm long; racemes 40 to 50 cm long, glabrous. Fruits in dense globose heads, 5 to 6 mm long, about 40 in each head, glabrous, narrowly obovoid, shortly 5- or 6-angled, the apical portion subconical, 5- or 6-sulcate, 5- or 6-celled; seeds narrowly oblong, flattened, 3.5 to 4 mm long.

In the mossy forest above 2,250 m, *For. Bur. 18126 Curran, Merritt, & Zschokke,* January 7, 1909 (type). I refer to the same species the following specimens: Province of Benguet, near Baguio, *Loher 3589, For. Bur. 18321 Alvarez, Williams 1305, Elmer 8693;* Mount Tonglon, *For. Bur. 14404 Darling:* Province of Bataan, Mount Mariveles, *Merrill 3847.* It is known to the Igorots of Benguet as *colamot.*

This species is allied to *Schefflera blancoi* Merr., and the last number cited was previously referred by me to that species. It is, however, very distinct from *S. blancoi,* differing in its more numerous, larger, more coriaceous leaflets, its much longer and glabrous racemes, much more numerous, smaller glabrous heads and other characters. *Schefflera blancoi* has subglobose to ellipsoid heads 2 to 3 cm long, from 5 to 10 heads in a raceme, the racemes short, paniculately disposed, the branches, and especially the heads furfuraceous-pubescent.

UMBELLIFERÆ.

HYDROCOTYLE Linn.

1. **H. rotundifolia** Roxb. Fl. Ind. **2** (1832) 88.

Lower borders of the mossy forest and in the upper pine region, *C. M. Z. 16036, Merrill 6537.*

Abundant in the Benguet-Lepanto region; mountains of India and Ceylon to southern China and Formosa, Malaya, and tropical Africa.

If the synonymy as given by C. B. Clarke in Hook. f. Fl. Brit. Ind. **2** (1879) 668 is correct, then the oldest valid name for this species is *H. nitidula* A. Rich. Monog. Hydrocot. (1820) no. 35, *f. 33.* The first use of the specific name *rotundifolia* by Roxburgh (1814), is a *nomen nudum. H. rotundifolia* Roxb. as interpreted by C. B. Clarke includes the two Philippine species recently described by Mr. Elmer, *H. benguetensis* and *H. delicata.*

[*To be continued.*]

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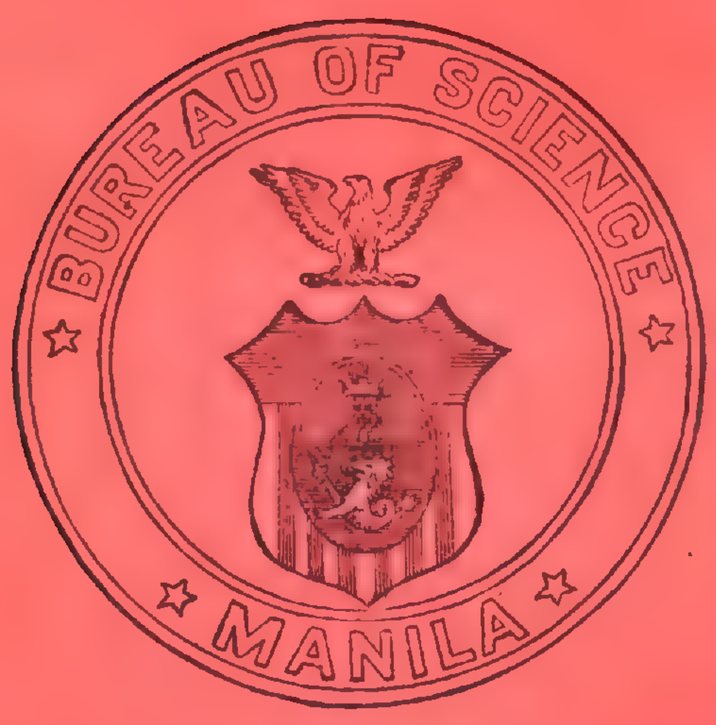

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THE PHILIPPINE

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C. BOTANY

VOL. V NOVEMBER, 1910 No. 5

THE FLORA OF MOUNT PULOG.

(Concluded.)

By E. D. MERRILL and M. L. MERRITT.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, and from the Bureau of Forestry, Manila, P. I.)

CLETHRACEÆ.

CLETHRA Linn.

1. **C. luzonica** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 38.

Extending from the lower to the upper limits of the mossy forest, and one of the characteristic trees of this formation, *C. M. Z. 18055, 18067, 18086, McGregor 8860, Merrill 6576.*

Common at higher altitudes throughout the Benguet-Lepanto region; endemic. Ig., *amogk.*

ERICACEÆ.

DIPLYCOSIA Blume.

1. **D. luzonica** (A. Gray) Merr. in Philip. Journ. Sci. **2** (1907) Bot. 293, l. c. **3** (1908) 378.

Mossy forest, extending to its upper limits, *C. M. Z. 18048.*

Higher mountains of northern and central Luzon, also in Mindanao; endemic.

RHODODENDRON Linn.

1. **R. subsessile** Rendle in Journ. Bot. **34** (1896) 357; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 379.

In ravines, pine region below the mossy forest, *C. M. Z. 18172*, and also on exposed grass-covered slopes of the summit, above the mossy forest, a depauperate form, *C. M. Z. 18035.*

Higher altitudes of the Benguet-Lepanto region, apparently closely allied to the Formosan *T. oldhami* Maxim.; endemic.

VACCINIUM Linn.

1. **V. barandanum** Vid. Rev. Pl. Vasc. Filip. (1886) 169; Merr. in Philip. Journ. Sci. **3** (1908) Bot. 376.

Common throughout the mossy forest, *C. M. Z. 16073, 18053, 18096.* Ig., *lusong.*

Higher mountains of the Benguet-Lepanto region, also on Mount Halcon, Mindoro; endemic.

2. **V. benguetense** Vid. l. c. 168; Merr. l. c. 376.

In ravines, pine region, altitude about 1,200 m, *C. M. Z. 18206.*

Medium altitudes in the Benguet-Lepanto region, and also on Mount Tapulao, Zambales, and in Mindoro; endemic.

3. **V. villarii** Vid. l. c. 166; Merr. l. c. 374.

On rock outcroppings, open grass lands of the summit, *C. M. Z. 16177.*

Common at higher altitudes on the mountains from northern Luzon to southeastern Mindanao; endemic.

MYRSINACEÆ.

MAESA Forsk.

1. **M. denticulata** Mez in Engl. Pflanzenreich **9** (1902) 48.

Stream depressions in the pine region, altitude about 1,400 m, *C. M. Z. 18174.*

Common and widely distributed in the Philippines at low and medium altitudes; endemic.

ARDISIA Sw.

1. **A. crispa** (Thunb.) A. DC. in Trans. Linn. Soc. **17** (1834) 124, Prodr. **8** (1844) 134; Mez l. c. 144.

Stream depressions in the pine region, altitude about 1,500 m, *C. M. Z. 18170.*

Known in the Philippines only from the Benguet-Lepanto region; India to China and Japan, southward to Java, Sumatra, and Borneo.

2. **A. pardalina** Mez in Engl. Pflanzenreich **9** (1902) 148.

In the mossy forest above 2,250 m altitude, *C. M. Z. 18130, 18141, Merrill 6556.*

At higher altitudes, Luzon to Mindanao; endemic.

3. **Ardisia curtipes** Merrill sp. nov. § *Pyrgus.*

Frutex vel arbor parvus, 3 ad 5 m altus, subglaber; foliis optime pseudo-verticillatis, elliptico-lanceolatis vel obovato-oblanceolatis, usque ad 11 cm longis, subintegris vel leviter denticulatis, acutis vel acuminatis; petiolo 5 ad 10 mm longo; paniculis plus minus exsertis, minutissime ferrugineo-puberulis, glabrescentibus.

An erect shrub or small tree 3 to 5 m high, nearly glabrous throughout. Branches terete, striate, glabrous, brownish. Leaves pseudoverticillate, elliptic-lanceolate to obovate-oblanceolate, chartaceous, 6 to 11 cm long, 1.8 to 4 cm wide, glabrous, shining, the margins entire or minutely denticulate, the apex acute or acuminate, base narrowed, cuneate; nerves 8 to 10 on each side of the midrib, distinct beneath, the reticulations prominent; petioles 5 to 10 mm long. Panicles terminal, exceeding the leaves, bipinnate, at first very minutely ferruginous-puberulent, becoming

quite glabrous. Flowers red or pink, subumbellately disposed at the ends of the ultimate branchlets, their pedicels about 1 cm long. Sepals broadly orbicular-ovate, acute, glandular-punctate throughout, about 2 mm long and wide, imbricate, their margins very minutely puberulent or glabrous. Corolla-lobes elliptic-ovate or ovate, about 5.5 mm long, 3 mm wide, blunt, sparingly glandular-punctate in the upper part, the base rounded or subauriculate, imbricate, the tube less than 1 mm long. Anthers 3 mm long, apiculate, the filaments very short. Ovary ferruginous-puberulent at the apex; style 4 to 5 mm long. Fruit subglobose or ovoid, about 1 cm in diameter, reddish, becoming dark-purple when mature, apiculate.

Confined to the mossy forest above an altitude of 2,250 m, *C. M. Z. 18093, 18097, 18137* (type), *McGregor 8827;* also represented by the following specimens: District of Lepanto, Mount Data, *Merrill 4496, Bur. Sci. 5956 Ramos:* Province of Benguet, Pauai, *Bur. Sci. 4402, 4409 Mearns, Bur. Sci. 8489 McGregor,* all the above specimens from similar habitats as those from Mount Pulog.

This species is manifestly very closely allied to *Ardisia serrata* (Cav.) Pers., which is widely distributed at low and medium altitudes in the Philippines; *A. curtipes*, however, differs constantly in its much smaller leaves, and in its shorter petioles, and accordingly is here separated from *A. serrata.* It is possible that the differentiating characters may be due to habitat, but, so far as our collections show, intermediate forms are not represented.

DISCOCALYX Mez.

1. **D. philippinensis** (A. DC.) Mez in Engl. Pflanzenreich **9** (1902) 212.

In the mossy forest, altitude above 2,250 m, *C. M. Z. 18138.*

Widely distributed in the Benguet-Lepanto region, and on other mountains in Luzon; the type (*Cuming 1385*) came from the Province of Nueva Ecija, Luzon, according to Cuming's own list of localities; endemic.

LOHERIA Merrill gen. nov.

Flores reductione sexus alterius unisexuales dioici, 4- vel rariter 5-meri. Sepala ut videtur imbricata, per anthesin aperta, basi usque ad medium partem connata, glabra, vix vel pauce punctata. Petala basi breviter (0.5 mm) connata, glabra, supra prominente punctato-glandulosa, per anthesin reflexa, apice emarginata. Stamina petalis bene breviora; filamentis latis, prope basim petalis affixa, quam antherae paulo longioribus; antheris birimose dehiscentibus, basifixis, late triangularibus, acutis. Ovarium glabrum, ovoideum; stylo crasso, quam ovarium paulo longiore; stigmate discoideo, lato. Placenta prope apicem uniseriatim 4-ovulata. Fructus globosus, monospermus. Semen globosum, albumine valde ruminato. Frutex parvus, erectus vix ramosus; foliis alternis, amplis, breviter petiolatis, integerrimis, minute puncticulatis versus caulis apicem dense congestis. Paniculae 1 ad 5, basi bracteis numerosis scariosis congestis subtensae in ramis specialibus axillaribus crassis apice cicatricosis suffultis.

Loheria bracteata Merrill sp. nov.

Frutex erectus vix ramosus glaber, 1 ad 3 m altus; foliis subcoriaceis, glabris, oblongo-obovatis vel late oblanceolatis, usque ad 32 cm longis, apice acutis, breviter late acuminatis, vel rotundatis; nervis utrinque circiter 15, prominentibus; paniculis glabris, 5 ad 8 cm longis, in ramis specialibus, floribus racemoso-dispositis, tetrameris vel pentameris.

An erect, glabrous, unbranched shrub 1.5 to 3 m high, the upper portions of the stems stout, brown, 1 cm in diameter. Leaves alternate, crowded at the apex of the trunk, oblong-obovate to broadly oblanceolate, subcoriaceous, 18 to 32 cm long, 5 to 10 cm wide, entire, smooth and shining when dry, glabrous, the apex blunt, acute, or shortly and broadly acuminate, sometimes rounded, gradually narrowed from above the middle to the base which is narrow and abruptly rounded, the lower surface with scattered, brownish, rounded glands; nerves about 15 on each side of the midrib, somewhat ascending, very prominent on both surfaces, anastomosing, the reticulations rather lax, distinct; petioles very stout, 1 cm long or less, sometimes nearly obsolete, 5 to 7 mm wide. Special branches bearing the inflorescence axillary, up to 5 or more on each trunk, stout, simple, terete, 2 to 4 cm long, the apical portions thickened and bearing numerous scars of fallen bracts, leafless or sometimes with a single much-reduced leaf, bearing at their apices numerous, many seriate, imbricate, oblong, scarious, membranaceous or chartaceous bracts 1 to 1.8 cm long, colored when fresh, usually brown when dry, forming a prominent involucre at the base of the panicle or panicles. Panicles one to five from the apices of the special branches, 5 to 8 cm long, glabrous, the primary branches few, mostly 1 cm long or less, spreading, the flowers racemosely disposed, comparatively few, their pedicels 1 to 2 mm long. Flowers apparently pink, 4- rarely 5-merous. Sepals broadly triangular-ovate, acute, about 1 mm long, spreading in anthesis, united for the lower one-half, glabrous, with very few scatered glands or the glands entirely wanting. Petals 4, rarely 5, oblong-elliptic, reflexed from the middle in anthesis, the apex irregularly emarginate, about 3 mm long, 1.2 mm wide, prominently glandular in the upper one-half, the lower 0.5 mm united, forming a short tube. Disk obscure. Stamens 4, rarely 5, opposite and attached to the base of the petals, the filaments nearly 1 mm long; anthers in the ♀ flowers rudimentary, broadly triangular, acute, basifixed, the base broad, somewhat sagittate, shorter than the filaments, opening by two marginal, somewhat introrse slits. Ovary ovoid, with four ovules immersed in the apex of the placenta; style 1.5 to 2 mm long, rather stout, somewhat longer then the ovary; stigma disciform. Fruit globose, 7 mm in diameter when fresh, red, 1-seeded, tipped by the remains of the style. Albumen prominently ruminate.

In the mossy forest above an altitude of 2,250 m, *For. Bur. 18083 Curran, Zschokke, & Merritt*, January, 1909, with ♀ flowers and immature fruit (type),

Suyoc to Pauai, *Merrill 4783*, November 7, 1907, with mature fruit: District of Lepanto, Mount Data, *Loher 3817*, only leaves seen.

This proposed new genus is probably most closely allied to *Discocalyx* Mez, from which it differs in its quite different flowers, notably in its triangular anthers, which are not sessile but which are borne on distinct filaments, its reflexed petals, and also in its seeds having a prominently ruminate albumen. In habit it is also quite different from most species of *Discocalyx*, but some species of the latter genus have their panicles borne on special axillary branches.

Loheria bracteata almost certainly includes, in part, the species described by Mez as *Embelia porteana*,[13] but the type of that species is interpreted by me as being the specimen collected by *Porte*, from which the specific name was taken. There is in our herbarium a specimen of *Loher 3817*, consisting of leaves only, which was identified by Mr. Rolfe at Kew as "*Ardisia=Vidal 1771*". This specimen is without doubt identical with the material on which the above generic and specific description of *Loheria bracteata* is based. Mez cites in the description of *Embelia porteana* two specimens, as follows: "Philippinen: Luzon bei Manilla (Porte), bei Leponto [Lepanto] (Com. Flor. forest. Filip. n. 1771).—Herb. Leiden, Paris." The latter specimen, *Vidal 1771*, was from the District of Lepanto, the same region from which the other specimens of *Loheria bracteata* were secured. Mr. Rolfe has kindly reëxamined the material in the Kew Herbarium, and informs me that the specimen of *Vidal 1771* is in fruit, and that *Loher 3817*, in flower, appears to represent the same species. Vidal gives the Igorot name as *gubgubao*.

Embelia porteana Mez, as described, is a very characteristic species, but in our extensive collections from all parts of the Philippines I could find no specimen that agreed perfectly with the description, but the material cited above had been tentatively referred to it, partly on the description and partly on the basis of Loher's specimen identified at Kew as equaling *Vidal 1771;* at the same time another series of specimens from Mindoro and Polillo that also agreed with the description in many particulars, but which represented a species quite distinct from the Benguet-Lepanto form, was placed with *Embelia porteana* Mez. After a careful study of all the material available here I was forced to come to the conclusion that *Embelia porteana* Mez is a composite species based on two quite different plants, although forms having somewhat similar gross characters and habit. In order more definitely to determine the matter two specimens, representing the two forms I had identified as *E. porteana* Mez, were sent to M. Gagnepain, of the Museum of Natural History, Paris, for comparison with Porte's specimen, the type of Mez's species. The specimens sent were *For. Bur. 18083 Curran, Merritt, & Zschokke*, cited above, the high mountain form from the Benguet-Lepanto region, and *Bur. Sci. 10411 McGregor*, a low-country form from Polillo. The difficulties in the identification of *Embelia porteana* Mez were pointed out, with the suggestion that the species was probably based on a mixture of two different forms, and that the Polillo plant, representing the low country form, and which agreed in the most essential characters with Mez's description, would probably more closely match Porte's specimen. It was not at all probable that Porte was able to penetrate the interior of northern Luzon at the time of his visit to the Philippines (1864), the Lepanto region being at that time rather inaccesible. M. Gagnepain has kindly made the desired comparison, and writes as follows:

"Le Muséum ne posséde de cette espèce [*Embelia Porteana* Mez] qu' une feuille cassée à la naissance du limbe (il est impossible donc de dire si elle est pétiolée), plus 2 inflorescences détachées.

[13] Pflanzenreich **9** (1902) 302.

"Quant à la localité précise je ne puis vous la donner pour la raison que l'étiquette de collecteur manque et que l'étiquette du déterminateur, Ad. Brongniart, est libellée ainsi, sans autre indication: '*Choripetalum Porteanum* Ad. Br. spec. nov. Manille - Porte, 1864.'"

As a result of the comparison M. Gagnepain reports that *Embelia porteana* Mez, that is, Porte's specimen, is matched very closely by the foliage of *Bur. Sci. 10411 McGregor*, even to the oblong transparent glands of the leaves, except that the leaves are slightly larger (30 by 10 cm, in the type 22 by 6.5 cm), but that the inflorescence is somewhat different in that the flowers are umbellate at the extremities of the secondary branches of the inflorescence, and the sepals are acuminate, but that *For. Bur. 18083 Curran, Merritt, & Zschokke*, represents a quite different species. He suggests that the flowers and leaves of Porte's specimen may have come from separate plants.

I have very little doubt, however, but that Mr. McGregor's specimen really represents *Embelia porteana* Mez, for on reëxamination of our material I find that the sepals are sometimes acute or even blunt, and that the flowers are in part subumbellate and in part racemose. The specimen agrees not only in leaf-characters with Porte's plant, as determined by M. Gagnepain, but also with Mez's description as to the puberulent inflorescence, size of the flowers, ciliolate and puncticulate sepals, and characters of the petals and stamens. Mez has described the species as having 3-merous flowers, but on our material 4-merous flowers are the rule, with occasional 3-merous and occasional 5-merous ones in the same inflorescence; the hurried sketch of a single flower supplied by M. Gagnepain, taken from Porte's specimen, shows a 4-merous one.

If I am correct in my assumption that two distinct forms are included in the original description of *Embelia porteana* Mez, then the diagnosis of that species must be corrected as follows:

Delete: (Folia) . . . apice acumine brevissimo peracutoque impositi rotundata . . . subcoriacea . . . utrinque optime prominenti-reticulata, punctulis minutis atris ∞ conspersa . . . . Bacca optime carnosa, crasse ellipsoidea, 5 mm diam., apice stylo persistente crasso brevique in stigma disciforme desinente valde apiculata.

Add: An erect, unbranched shrub 0.5 to 0.8 m high, the stems terete, glabrous, brown, nearly 1 cm in diameter at the apex. Leaves alternate, crowded at the apices of the stems, chartaceous, broadly oblong-oblanceolate to narrowly elliptic-lanceolate, 20 to 30 cm long, 5.5 to 10 cm wide, glabrous except for the very numerous, minute, obscure, brown or pale, lepidote scales beneath, with no black dots, but with numerous transparent, oblong glands in transmitted light, entire or obscurely toothed, brown when dry, scarcely shining, the apex rather abruptly and sharply subcaudate acuminate, narrowed below to the narrow and abruptly rounded base which is at most 1.5 cm in width; nerves 16 to 18 on each side of the midrib, ascending, anastomosing, prominent beneath, not prominent on the upper surface, the reticulations lax, nearly or quite obsolete on the upper surface; petioles stout, 1 cm long or less, often nearly obsolete, the stem among and immediately below the leaves with numerous, imbricate, scarious, membranaceous, lanceolate, acuminate, brown bracts (scarcely stipules) 1 to 4 cm in length. Panicles few, solitary, slender, in the upper axils, including the peduncles 9 cm long or less, bipinnately paniculate, the peduncles slender, up to 6 cm in length, the primary branches about 1 cm long, the flowers racemosely or subumbellately arranged, their pedicels up to 2.5 mm in length. Staminate flowers yellowish, 2 mm long, 4-merous, rarely 3-merous or 5-merous.

As interpreted by me, this species is represented by the type, collected by Porte (Paris Herbarium), and by the following specimens: MINDORO, south of

Lake Naujan, in forests at an altitude of about 8 m, *For. Bur. 6886 Merritt*, April, 1907, with staminate flowers. POLILLO, in forests, *Bur. Sci. 10411 McGregor*, October, 1909, staminate flowers. A form with broader leaves (11 cm), their margins distinctly sinuate-dentate is represented by a specimen from MINDORO, Alag River, *Merrill 5743*, November, 1906, in forests at an altitude of about 140 m, with immature fruit.

Embelia porteana Mez, if the species has been correctly interpreted by me, is so distinct in habit from all others of the genus, and differs also in its anthers being basifixed, gradually merging with the filaments, and opening by terminal or subterminal pores, that I am of the opinion that the section should be raised to generic rank. Before taking this step, however, it will be advisable to make a very careful examination of Porte's specimen, and a critical comparison of the same with recently collected material, because Doctor Mez gives two characters, undoubtedly taken from Porte's specimen, that I have been unable to observe in the material I have referred to *Embelia porteana;* these characters are the rudimentary ovary in the staminate flower, which is quite wanting in our two specimens, and the anthers glandular on the back, which also does not apply to our material.

The specimen collected by Porte, although undoubtedly Philippine, was in all probability not collected near Manila. I have no information as to the regions visited by Porte, and, at least in the case of the present species, no definite localities are given on his labels. Judging from other species collected by him in the Philippines, he may have botanized in Mindoro, or in parts of Luzon opposite to that island.

Loheria is named in honor of Mr. A. Loher, well known for his extensive collections of Philippine plants. It is a monotypic genus confined to the mossy forests of the mountains of northern Luzon above an altitude of 2,000 m. *Embelia porteana* Mez, on the other hand, is found in more or less humid forests in the low country, from about sea level to an altitude of about 150 m.

EMBELIA Burm.

1. **E. philippinensis** A. DC. Prodr. **8** (1844) 83; Mez l. c. 306.

In the mossy forest above an altitude of 2,250 m, *McGregor 8812, Merrill 6559.*

Widely distributed in the Philippines; endemic. The above specimens differ slightly from the original form of the species, chiefly in the pedicels exceeding the bracteoles in length.

RAPANEA Aubl.

1. **R. philippinensis** (A. DC.) Mez in Engl. Pflanzenreich **9** (1902) 364.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 18038, 18139.*

Widely distributed in the Philippines, especially at higher altitudes, although in some localities found near sea level; endemic.

PRIMULACEÆ.

LYSIMACHIA (Tourn.) Linn.

1. **L. ramosa** Wall. Cat. (1828) no. 1490, *nomen;* Duby in DC. Prodr. **8** (1844) 65.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 16099.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region and from Mount Halcon, Mindoro; Himalayan region, Khasia Mountains, Burma, and Java.

SYMPLOCACEÆ.

SYMPLOCOS, Linn.

1. **S. depauperata** Merr. in Govt. Lab. Publ. **29** (1905) 45.

Abundant and widely distributed in the mossy forest, *C. M. Z. 18059, 18075, 18107, McGregor 8829, 8895.*

At higher altitudes in the Benguet-Lepanto region, a variety in the mountains of Panay; endemic.

2. **S. imbricata** Brand in Philip. Journ. Sci. **4** (1909) Bot. 108.

In the mossy forest, altitude above 2,300 m, *C. M. Z. 18091, Merrill 6584.*

Known only from the mountains of Benguet and Zambales Provinces, Luzon.

3. **S. whitfordii** Brand l. c. **3** (1908) Bot. 8.

In the mossy forest, above an altitude of 2,300 m, *C. M. Z. 16330, 18089.*

Previously known only from Mount Banajao, Luzon.

OLEACEÆ.

JASMINUM Linn.

1. **J. aculeatum** (Blanco) Walp. in Linnaea **16,** Litterb. 3, 12; Hassk. in Flora **47** (1864) 50.

In the pine region, altitude below 1,500 m, *C. M. Z. 18191;* the specimen is sterile but is apparently referable here.

Widely distributed in the Philippines but local; endemic.

LOGANIACEÆ.

BUDDLEIA L.

1. **B. asiatica** Lour. Fl. Cochinch. (1790) 72.

In the upper pine region, *C. M. Z. 18157.*

Widely distributed in the Philippines at low and medium altitudes; India to China and Malaya.

GENTIANACEÆ.

GENTIANA Linn.

1. **G. luzoniensis** Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 224.

Abundant in the open grass lands of the summit, flower open only when the sun is shining, *C. M. Z. 16098, Merrill 6617, McGregor 8892.*

Known only from Mount Data, in Lepanto, and Pauai, in Benguet, with a very closely allied, if not identical form on Mount Banajao, Laguna. The specimens cited above, as well as others recently collected at Pauai are much taller than the type, but are manifestly the same species.

SWERTIA Linn.

1. **S. decurrens** C. B. Rob. in Philip. Journ. Sci. **3** (1908) Bot. 214.

On grass covered slopes in the upper pine region, *C. M. Z. 16169.*

Known only from high altitudes in the Benguet region.

ASCLEPIADACEÆ.

SARCOSTEMMA R. Br.

1. **S. brunonianum** W. & A. in Wight Contrib. (1834) 59; Ic. *t. 1282.*

Habitat not given, probably in stream depressions in the pine region, *C. M. Z. 16035;* also represented by two other collections from Benguet Province, *Bur. Sci. 3487 Mearns, Elmer 5991.*

This species has been identified by comparison with descriptions and figures only, and I can detect no characters by which it can be separated from the Indian form; Deccan Peninsula, India, ascending to 1,300 m in the Nilgherry Mountains, and Ceylon.

TYLOPHORA R. Br.

1. **T.** sp.

Pine region below 1,300 m, *C. M. Z. 16093.*

Probably an undescribed species, apparently allied to *Tylophora elmeri* Schltr.

HOYA R. Br.

1. **H. cumingiana** Dene. in DC. Prodr. **8** (1844) 636.

On boulders in stream depressions in the pine region, altitude 1,200 m, *C. M. Z. 16094, Merrill 6352.*

Endemic; very closely allied to *H. densifolia* Turcz., of Java, and the latter species perhaps not specifically distinct. See Backer Ic. Bogor. **3** (1908) 157, *t. 257.*

CONVOLVULACEÆ.

IPOMOEA Linn.

1. **I. batatas** (Linn.) Poir. in Lam. Encycl. **6** (1804) 14.

Extensively cultivated by the Igorots throughout the area below the lower limits of the mossy forest, *C. M. Z. 18158.*

Tropical and subtemperate parts of the world; extensively cultivated. The sweet potato.

BORAGINACEÆ.

EHRETIA Linn.

1. **E. philippinensis** A. DC. Prodr. **9** (1845) 504.

In stream depressions, pine region, altitude about 1,500 m, *C. M. Z. 18198.*

An endemic species widely distributed in the Philippines at low and medium altitudes; perhaps not specifically distinct from the widely distributed Indo-Malayan-Australian *E. laevis* Roxb.

TOURNEFORTIA Linn.

1. **T. horsfieldii** Miq. Fl. Ind. Bat. **2** (1857) 927.

In the pine region, altitude about 1,500 m, *C. M. Z. 16103.*

At medium altitudes in Luzon; Malaya.

CYNOGLOSSUM Tourn.

1. **C. furcatum** Wall. in Roxb. Fl. Ind. **2** (1824) 6.

In stream depressions, pine region, altitude about 1,500 m, *C. M. Z. 16332.*

In the Philippines known only from the Benguet-Lepanto region; Afghanistan to India, Ceylon, China, and Japan.

VERBENACEÆ.

PREMNA Linn.

1. **P. odorata** Blanco Fl. Filip. (1837) 488.
In stream depressions, altitude about 1,200 m, *C. M. Z. 18220*.
Abundant and widely distributed in the Philippines at low altitudes; endemic.

CALLICARPA Linn.

1. **C. caudata** Maxim. in Bull. Acad. Pétersb. 31 (1887) 76.
In the pine region, altitude about 1,700 m, *C. M. Z. 18163*, and apparently also *C. M. Z. 18127*, a less tomentose form, from the mossy forest.
Widely distributed at higher altitudes in the Philippines; endemic.

2. **Callicarpa stenophylla** Merrill sp. nov.

Arbuscula 3 ad 4 m alta, ramis gracilibus, teretibus, glabris, ramulis densissime stellato-pubescentibus; foliis lanceolatis vel anguste lanceolatis, usque ad 15 cm longis, 1 ad 2 cm latis, denticulatis, sensim longe subcaudato-acuminatis, supra subglabris vel pilis brevibus simplicibus praeditis, subtus minutissime glandulosis et plus minus dense stellato-tomentosis; floribus brevibus, tetrameris.

A shrub 3 to 4 m high, the young branchlets densely stellate-pubescent, the leaves beneath more or less densely and simply (not plumose) stellate-pubescent. Branches slender, terete, glabrous, grayish- or reddish-brown. Leaves lanceolate or narrowly lanceolate, membranaceous or chartaceous, 7 to 15 cm long, 1 to 2 cm wide, straight or somewhat falcate, the upper surface subglabrous, or with scattered, very short, simple hairs, the lower surface with numerous, very minute, dark-colored, yellow, or reddish glands, and also more or less densely pubescent with rather pale or brownish, stellately arranged hairs, the margins denticulate, the base acute, the apex gradually and slenderly long-acuminate; nerves about 9 on each side of the midrib, curved-ascending, anastomosing; petioles stellate-pubescent, 2 to 4 mm long. Cymes axillary, solitary, about 2 cm long, 2 to 2.5 cm wide, rather dense, stellate-pubescent, the bracts subtending the primary branches linear-lanceolate, 3 mm long, the bracteoles similar, 1 mm long, the pedicels very short. Calyx nearly glabrous, about 1 mm long, cup-shaped, obscurely 4-angled, and with 4 short teeth. Corolla 2 mm long, subequally 4-lobed, the lobes rounded, 0.4 mm long. Filaments exserted, 3 mm long; anthers ellipsoid, 0.3 mm in length. Fruit purple, globose, about 1.5 mm in diameter when dry.

In the pine region, altitude about 1,800 m, *C. M. Z. 18162*. The type of the species is *Bur. Sci. 5739 Ramos*, from the Sablan River, near Baguio, Benguet, and it is also represented by *Bur. Sci. 5790 Ramos*, probably from the same locality, and *For. Bur. 16574 Darling*, from the District of Lepanto, Mount Malaya, altitude about 1,500 m.

Probably most closely allied to *Callicarpa caudata* Maxim., differing in its less dense and simply stellate, not plumose-stellate indumentum. It is well characterized by its narrow leaves which are very long and slenderly acuminate.

LABIATÆ.

SCUTELLARIA Linn.

1. **S. luzonica** Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 315.

In the mossy forest, *Merrill 6549*, *McGregor 8887*, above 2,250 m altitude; also in stream depressions, altitude 1,450 m, *C. M. Z. 16070*.

Widely distributed at higher altitudes in the Benguet-Lepanto region, and occurring on the mountains southward; Formosa.

When writing the original description Mr. Rolfe had two specimens collected by Lobb in Luzon, and the material above cited agrees with the specimen designated by him in the Kew herbarium as the type; the other specimen of Lobb's is the small-leaved form recently described by Mr. Elmer as *Scutellaria marivelensis* (Leafl. Philip. Bot. **2** (1908) 516). Intermediate forms occur, and I am disposed to consider *S. marivelensis* Elm. to be only a form of *S. luzonica* Rolfe with reduced leaves. *Scutellaria russeliaefolia* Vatke Bot. Zeit. **30** (1872) 716, based on a specimen collected by Jagor in Luzon, the type of which I have seen in the Berlin Herbarium, is also closely allied to *S. luzonica*, and may prove to be only a large-leaved form of the latter. *Merrill 3925* from Mount Arayat, Luzon, consists of material that, so far as the leaves are concerned, shows typical *S. luzonica*, *S. marivelensis*, and I feel confident that but a single species is represented by that number.

LEUCAS R. Br.

1. **L. mollissima** Wall. Pl. As. Rar. **1** (1830) 62.

In the pine region below 1,500 m altitude, *C. M. Z. 16338*.

This species has not definitely been reported from the Philippines previously, but appears to be widely distributed in Benguet. It is represented also by *Topping 53, 137*, *Elmer 6576*, *Williams 1360*, and *Bur. Sci. 5323, 5456 Ramos*, all from Benguet. Philippine specimens identified at Kew as *Leucas marrubioides* Desf., appear to belong here, at least in part (*Loher 4226*). *Leucas sericea* Elm. Leafl. Philip. Bot. **1** (1908) 340 is also closely allied; it appears to be the same as *Vidal 3468* from Panay, determined at Kew as *L. marrubioides* Desf.

India to southern China, and Formosa.

POGOSTEMON Desf.

1. **P. philippinensis** Moore in Journ. Bot. **43** (1905) 146.

In the mossy forest, *Merrill 6558*, *C. M. Z. 16065*.

Known only from higher altitudes in the Benguet-Lepanto region, and from the mountains of Panay.

HYPTIS Jacq.

1. **H. capitata** Jacq. Coll. **1** (1786) 102.

In the pine region, altitude about 1,500 m, *C. M. Z. 16068*.

Common and widely distributed in the Philippines; introduced from tropical America. Briquet [14] has referred Philippine material (*Cuming 591*) to *Hyptis lanceolata* Poir. This specimen is apparently identical with our abundant Philippine collections identified as *H. capitata* Jacq.

[14] Ann. Conserv. Jard. Bot. Genèv. **2** (1898) 225.

COLEUS Lour.

1. **C. macranthus** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 234.
Common in the mossy forest, *Merrill 6604, C. M. Z. 16146.*
Known only from high altitudes in the Benguet-Lepanto region.

2. **C. crispipilus** Merrill comb. nov.
Coleus macranthus var. *crispipila* Merr. l. c.
In the mossy forest, *Merrill 6553, McGregor 8896, C. M. Z. 16066.*

Like the preceding known only from high altitudes in the Benguet-Lepanto region; I am now of the opinion that this form is worthy of specific rank. The fresh plant is aromatic when crushed.

3. **Coleus zschokkei** Merrill sp. nov.

Suffruticosus, erectus, circiter 60 cm altus, ramulis, foliis, inflorescentiisque cinereo-puberulis; foliis parvis, elliptico-ovatis vel ovatis, acutis vel acuminatis, circiter 3 cm longis, subtus dense glandulosis; inflorescentiis circiter 15 cm longis; calycibus fructiferis declinatis, intus nudis, dentibus lateralibus brevibus, truncatis.

Suffrutescent, erect, about 60 cm high, branched, the stems about 8 mm in diameter, the branches stout, obscurely 4-angled, brown, puberulent. Leaves elliptic-ovate to elliptic, rather thin, densely gray-puberulent, about 3 cm long, 1 to 1.5 cm wide, beneath strongly and densely glandular-punctate, the apex acute or acuminate, the base acute, margins crenate or crenate-dentate in the upper two-thirds; nerves about 4 on each side of the midrib, ascending; petioles puberulent, 3 to 10 cm long. Inflorescence about 15 cm long, puberulent, the verticils of lax, 1.5 cm long, few-flowered cymes. Flowers purple, the pedicels pubescent, slender, about 5 mm long. Calyx glandular and pubescent, 5.5 mm long in fruit, declinate, glabrous within, the lower lip oblong-lanceolate, about 4 mm long, cleft into two, lanceolate, acuminate, 0.8 mm long teeth; upper lip much shorter, 3-toothed, the middle tooth elliptic-ovate, rounded, 2 mm long, the two lateral ones rectangular, truncate, 1 mm long and wide. Corolla purple, with minute, scattered glands, and slightly ciliate, 8 mm long, the tube slender, decurved; upper lip broad, irregularly lobed, about 2 mm long, the lower one boat-shaped, somewhat hooded, 5 mm long. Upper portions (2.5 mm) of the filaments free, the remainder connate into a tube. Nutlets rounded, compressed, black, shining, 1 mm in diameter.

In stream depression, lower pine region, *Merrill 6529* (type), and in grass lands in the open pine region, altitude about 1,700 m, *C. M. Z. 16325.*

Quite different from any of the other Philippine species of the genus; recognizable by its comparatively small leaves, and by its grayish puberulence.

PLECTRANTHUS L'Her.

1. **P. diffusus** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 235.
In the pine region, altitude about 2,000 m, *C. M. Z. 16067, 16228.*
Known only from high altitudes in the Benguet-Lepanto region.

CALAMINTHA Moench.

1. **C. umbrosa** (Bieb.) Benth. in DC. Prodr. 12 (1848) 232.

Upper pine region extending into the lower limits of the mossy forest, *C. M. Z. 16069, Merrill 6582, McGregor 882¼.*

Known in the Philippines only from the Benguet-Lepanto region; Caucasas Mountains, India, Ceylon, China, Japan, Formosa, and Java.

SOLANACEÆ.

SOLANUM Linn.

1. **S. inaequilaterale** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 236.

In the mossy forest, altitude about 2,300 m, *C. M. Z. 16200.*

This form is known only from the Benguet-Lepanto region; it may not prove to be specifically distinct from the widely distributed *S. torvum* Sw. *S. unaequilaterale,* however, is entirely unarmed.

2. **S. nigrum** Linn. Sp. Pl. (1753) 186.

In the mossy forest, altitude about 2,300 m, *C. M. Z. 16063.* Mr. Merritt notes that the local name of this plant is *natang,* and that the leaves are eaten by the Igorots.

Abundant in the Philippines at all altitudes; temperate and tropical parts of the world.

3. **S. retrorsum** Elm. Leafl. Philip. Bot. 1 (1908) 342.

Stream depressions in the pine region below an altitude of 1,200 m, *C. M. Z. 16202.*

Known only from the Benguet-Lepanto region. In addition to the type specimen cited in the original description, the species is also represented by the following material: *Loher 4378, 4379* (herb. Kew), *Vidal 3366* (herb. Kew), *For. Bur. 4874, 15595 Curran, Bur. Sci. 5362 Ramos, Bur. Sci. 3375, 3415 Mearns, Elmer 6073, Williams 1074.*

4. **S. verbascifolium** Linn. Sp. Pl. (1753) 184.

In stream depressions, pine region, altitude about 1,500 m, *C. M. Z. 18177.*

Widely distributed in the Philippines at low and medium altitudes; Tropics of the world.

5. **Solanum schizocalyx** Merrill sp. nov. § *Lysianthes, Lobanthes.*

Herbaceum vel suffruticosum, erectum, ramosum, subglabrum; foliis petiolatis, alternis, solitariis, in ramulis geminis, altero dimidio tertio minore, membranaceis vel subchartaceis, oblongo-lanceolatis vel lanceolatis, integris, longe acuminatis; floribus axillaribus, solitariis, binis vel fasciculatis, albidis vel pallide purpureis, 1 ad 1.3 cm longis; calycibus 10-dentatis, dentibus subulatis.

An erect, branched, often suffrutescent herb 1 m high or less, subglabrous. Branches terete, rather slender, grayish or dark-colored, glabrous, the ultimate branchlets sometimes slightly pubescent. Leaves simple, oblong-lanceolate to lanceolate, membranaceous or subchartaceous, glabrous or with few, scattered, short hairs on the nerves on both surfaces, 4 to 15 cm long, 1.5 to 4.5 cm wide, often dark-colored and somewhat shining when dry, entire, the base decurrent-acuminate, the apex long and slenderly acuminate, those on the stems alternate, on the

branches in pairs, the smaller one of each pair one-third to one-half shorter than the other; nerves about 6 on each side of the midrib, ascending, rather distinct on the lower surface; petioles 0.5 to 2.5 cm long. Flowers axillary, solitary, in pairs, or in fascicles of 3 or 4, white to pale-purplish, the pedicels 1 to 2.5 cm long, in anthesis somewhat thickened upward, spreading or reflexed, rarely erect or ascending, glabrous. Calyx glabrous or slightly and obscurely puberulent, somewhat funnel-shaped, becoming broadly cup-shaped in anthesis, the rim subentire, the 10 ridges extending as narrow, stout, blunt teeth 1 to 2 mm in length, the calyx in bud prominently ridged, in anthesis the ridges becoming more obscure, the calyx splitting down one side. Corolla-tube about 4 mm long, the lobes 5, oblong-ovate or ovate, acute, 7 to 9 mm long. Anthers 5, oblong, about 5 mm long. Style about 8 mm long. Fruit globose, fleshy, 1 cm in diameter (immature).

In the mossy forest above an altitude of 2,300 m, *C. M. Z. 16201, 16203, McGregor 8814, Merrill 6588.* From similar habitats, *Bur. Sci. 4401, 3418 Mearns,* Pauai, Benguet, and *Merrill 4548* (type), from Mount Data, District of Lepanto, Luzon.

This species is manifestly allied to *Solanum biflorum* Lour., but is apparently sufficiently distinct from that and all hitherto described allied forms. Its distinguishing features are in being nearly glabrous, with comparatively large flowers, and its calyx splitting down one side.

LYCOPERSICUM Tourn.

1. **L. esculentum** Mill. Gard. Dict. ed. 8 (1768) no. 2.

Cultivated by the Igorots, pine region, altitude about 1,800 m, *C. M. Z. 16335.*

Cultivated and subspontaneous throughout the Philippines, introduced from tropical America; cultivated everywhere in temperate and tropical regions.

NICOTIANA Linn.

1. **N. tabacum** Linn. Sp. Pl. (1753) 180.

Cultivated by the Igorots, altitude about 1,200 m, *C. M. Z. 16165.*

Extensively cultivated in the Philippines, a native of tropical America, and now cultivated in most temperate and tropical countries.

SCROPHULARIACEÆ.

LINDENBERGIA Lehm.

1. **L. philippensis** (Cham.) Benth. in DC. Prodr. 10 (1846) 377.

In stream depressions, pine region, below an altitude of 1,500 m, *C. M. Z. 16071.*

Common and widely distributed in the Philippines at low and medium altitudes; Chittagong to Tenasserim, Siam, and China.

HEMIPHRAGMA Wall.

1. **H. heterophyllum** Wall. Cat. (1831) no. 3895; Benth. in DC. Prodr. 10 (1846) 429.

Mossy forest above an altitude of 2,300 m, *C. M. Z. 16041.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; temperate Himalaya, Khasia Mountains, southern China, and Formosa.

VANDELLIA Linn.

1. **V. crustacea** (L.) Benth. in DC. Prodr. 10 (1846) 413.

In the pine region, ascending to an altitude of about 1,800 m, *C. M. Z. 16039.*

Abundant and widely distributed in the Philippines; widely distributed in the Tropics of the world.

VERONICA Linn.

Veronica monantha Merrill sp. nov. § *Beccabunga, Calycinae.*

Herba annua, repens, parce pilosa; foliis oppositis, late ovatis, pauce crenato-serratis, petiolatis; floribus tetrameris, axillaribus, pedicellatis, solitariis; capsulis late obcordatis, compressis, valvis submembranaceis; seminibus paucis, ellipsoideis.

An annual creeping herb, the stems reaching a length of 15 cm, slender, all parts with scattered, weak, crisped, white hairs. Leaves broadly ovate, about 8 mm long and wide, thin, opposite, the base broad, truncate, the apex acute, the margins with two or three rather coarse crenate-dentate teeth; nerves few, anastomosing, the reticulations lax; petioles nearly as long as the leaves. Flowers axillary, solitary, white, 4-merous, their pedicels about 6 mm long; bracteoles two, at about the lower third of the pedicel, oblong, 1-nerved, 3.5 mm long. Sepals 4, oblong, acute, thin, with a midnerve and two marginal nerves, the latter joining the midnerve near the apex with a single anastomosis, about 4 mm long, 1.2 mm wide, somewhat accrescent. Corolla white, campanulate, 4.5 to 5 mm long, the lobes rounded, the widest ones 3.3 mm in width; tube less than 0.5 mm long. Filaments about 4 mm long; anthers 1 mm long, hairy. Ovary ovoid, compressed, 1 mm long; style 3 mm in length. Capsule thin, compressed, broadly obcordate, 6 mm wide, 4 mm long, slightly cleft at the apex or subentire, dehiscing at the apex, the valves thin; seeds about 12, ellipsoid, about 1 mm long, compressed, biconvex.

In the mossy forest, associated with *Ellisiophyllum* and *Peracarpa,* in dense thickets just below the lower limits of the summit grass lands, *Merrill 6593,* May, 1909; rare.

The first representative of the genus to be found in the Philippines, and apparently allied to a group of species characteristic of Australia and New Zealand.

SOPUBIA Ham.

1. **S. trifida** Ham. in Don Prodr. (1825) 88.

In the pine region, ascending to an altitude of 2,100 m, *C. M. Z. 16040.*

Known in the Philippines only from the Benguet-Lepanto region; Himalayan region, Khasia Mountains, Deccan Peninsula, Ceylon, and southern China.

EUPHRASIA Linn.

1. **E. borneensis** Stapf. in Trans. Linn. Soc. Bot. II 4 (1894) 210.

Lower limits of the mossy forest, *Merrill 6491,* and in the open grass lands of the summit, *C. M. Z. 16038, McGregor 8886.*

In the Philippines known only from higher altitudes in the Benguet-Lepanto region; Mount Kinabalu, northeastern Borneo. Closely allied to New Zealand forms.

BUCHNERA Linn.

1. **B. urticifolia** R. Br. Prodr. (1810) 437.

In the pine region, altitude about 1,500 m, *C. M. Z. 16341.*

Rather widely distributed in the Philippines at low and medium altitudes; northern and eastern Australia.

ELLISIOPHYLLUM Maxim.

1. **E. pinnatum** (Wall.) Makino in Bot. Mag. Tokyo **20** (1906) 91, *pl. 5.*

In the mossy forest just below the lower limits of the upper grass lands; known in the Philippines only from high altitudes in the Benguet-Lepanto region.

Mountains of India to China, Japan, and Formosa.

This genus was originally placed by Maximowicz in the *Polemoniaceae,* but Bentham and Hooker transferred it to the *Hydrophyllaceae,* in which family it was retained by Engler and Prantl. Baillon, however, has shown that it really belongs in the *Scrophulariaceae,* and this conclusion is upheld by Dr. A. Brand, who has recently studied the genus.[15]

GESNERIACEÆ.

TRICHOSPORUM Don.

1. **T. philippinense** (Clarke) O. Kuntze Rev. Gen. Pl. (1891) 478.

In the mossy forest, *C. M. Z. 16166.*

Widely distributed on the higher mountains of the Philippines; endemic.

2. **T. nervosum** Elmer Leafl. Philip. Bot. **1** (1908) 344.

Frutex scandens; foliis ovato-lanceolatis vel lanceolatis, acuminatis, basi obtusis, usque ad 6 cm longis, 2 cm latis, nervis utrinque 4 ad 6, valde obliquis, in sicco prominentibus; floribus rubro-aurantiacis, axillaribus vel terminalibus; corolla 3.5 cm longa, curvata.

In the mossy forest, *McGregor 8861.*

Similar to the preceding species, but distinguishable by its strongly nerved leaves. Known only from medium or higher altitudes in the Benguet-Lepanto region.

CYRTANDRA Forst.

1. **C.** sp.

In the mossy forest, *Merrill 6603.*

ACANTHACEÆ.

STROBILANTHES Blume.

1. **S. pluriformis** C. B. Clarke in Govt. Lab. Publ. (Philip.) **35** (1906) 93.

Mossy forest above 2,000 m, *C. M. Z. 16144, Merrill 6488.*

An endemic species, characteristic of the higher mountains of the northern Philippines.

LEPIDAGATHIS Willd.

1. **L. dispar** C. B. Clarke in herb. sp. nov.

Herba suffruticosa, ramosa, suberecta, inflorescentiis exceptis glabra; foliis chartaceis vel subcoriaceis, ovato-lanceolatis vel anguste lanceolatis,

[15] Helios **26** (1910).

acuminatis, usque ad 12 cm longis, in quoque nodo valde inaequalibus; spicis axillaribus terminalibusque, densis, fasciculatis, sessilibus; floribus 6 mm longis, 5-meris.

A suberect, usually branched, nearly glabrous, suffrutescent herb up to 80 cm in height, the branches distinctly quadrangular. Leaves ovate-lanceolate to narrowly lanceolate, in unequal pairs, one leaf of each pair usually about twice as large as the other, 6 to 12 cm long, 0.8 to 3 cm wide, usually acuminate at both ends; nerves about 6 on each side of the midrib, prominent. Spikes axillary and terminal, very dense, usually clustered, sessile, the bracts white-ciliate. Flowers about 6 mm long. Sepals 5, narrowly lanceolate, strongly acuminate, 5 mm long. Capsule 5 mm long, acuminate, puberulent at the apex.

LUZON, Province of Benguet, *Elmer 6059* (det. Clarke), *Topping 82, Bur. Sci. 6670 Ramos:* Province of Nueva Vizcaya, *Merrill 285:* Province of Rizal, *Bur. Sci. 2053 Ramos, For. Bur. 2697 Ahern's collector* (det. Clarke), *Loher s. n., Bur. Sci. 9651 Robinson.*

"This species is well represented in the Philippines, and resembles *L. incurva* G. Don, but has smaller, slenderer bracts and calyx. It is exceedingly near *L. javanica* Blume, and near other species." (C. B. Clarke in lit. July 7, 1905.)

From Mount Pulog I have two specimens from the pine region below an altitude of 1,300 m, *C. M. Z. 16082, 16087.*

2. **L. cinerea** sp. nov.

Suffruticosa, erecta, ramosa, usque ad 1 m alta, omnibus partibus dense cinereo-puberulis, inflorescentiis dense albido-lanato-ciliatis; foliis anguste oblongis vel anguste oblongo-oblanceolatis, vix 2 cm longis, obtusis vel apiculatis, subsessilibus; spicis ovoideis vel oblongis, densis, terminalibus, solitariis, 1 ad 4 cm longis; floribus tetrameris, rubris, bracteis oblongo-lanceolatis, cum calycis segmentis dense albido-lanato-ciliatis.

An erect, usually much branched, suffrutescent or woody plant, 1 m high or less, the stems pale-brown, terete, about 5 mm in diameter, ultimately glabrous, the younger branches and leaves densely cinereous-puberulent. Leaves opposite, coriaceous, equal, narrowly oblong or narrowly oblong-oblanceolate, 0.8 to 1.8 cm long, 3 to 6 mm wide, entire, narrowed to the sessile or subsessile base, the apex obtuse or somewhat apiculate, puberulent; nerves 4 or 5 on each side of the midrib, ascending, distinct. Spikes terminating the branches, solitary, sometimes somewhat crowded at the apex of the main stem, ovoid to oblong, 1 to 4 cm long, about 1 cm in diameter, very dense, the bracts and calyx-segments densely covered with long, soft, white hairs. Bracts oblong-lanceolate, prominently acuminate, 1-nerved, rarely with a pair of obscure lateral nerves, about 8 mm long, 2.5 to 3 mm wide. Calyx-segments all acuminate, one lanceolate, about 7 mm long, 1.8 mm wide, prominently and slenderly acuminate, obscurely 3-nerved, very obscurely reticulate in the upper one-half, the lanate hairs about 2 mm long, two linear, less

than 1 mm wide, the fourth cleft to within 3.5 mm of the base, the lobes about 1 mm wide, lanceolate. Corolla reddish, 8 mm long, slightly puberulent outside, the throat villous inside, the tube not contracted; upper lip rounded or slightly retuse, about 3 mm long, 2 mm wide, the lower one cleft into three, narrowly oblong, obtuse lobes about 3 mm long, 1.2 mm wide. Anthers 1.7 mm long, slightly exserted from the throat of the corolla-tube, one cell slightly higher than the other, cells parallel, not divergent.

In the pine region at an altitude of about 1,500 m, *For. Bur. 16078 Curran, Merritt, & Zschokke,* January, 1909; between Ambuklao and Daklan, *Merrill 4395,* October, 1905 (type); without definite locality, *Bur. Sci. 5912 Ramos,* December, 1908.

The above specimens were distributed as *Lepidagathis incana* Nees, a Javan species, to which the present one does not seem to be at all closely allied. *Lepidagathis cinerea* is well characterized by its small, narrow, subsessile leaves, its cinereous indumentum, and especially by its very dense, prominently white-ciliate-lanate spikes.

RUNGIA Nees.

1. **R. parviflora** Nees in Wall. Pl. As. Rar. 3 (1832) 110, DC. Prodr. 11 (1847) 469.

Pine region below 2,000 m, *C. M. Z. 16080.*

Not before recorded from the Philippines; also represented by *Merrill 4557* from Mount Data (det. Clarke).

Eastern and southern India and Ceylon to southern China.

HYPOESTES R. Br.

1. **H. floribunda** R. Br. Prodr. (1810) 474; Nees in DC. Prodr. 11 (1847) 509.

Pine region below 1,100 m, *C. M. Z. 16079.*

The same form is also represented by the following specimens: District of Lepanto, *For. Bur. 5690 Klemme:* Province of Ilocos Norte, *For. Bur. 12486 Merritt & Darling:* Province of Benguet, *Williams 1389, Elmer 5877.*

The late C. B. Clarke, who referred *Elmer 5877* to *Hypoestes floribunda,* with doubt, states that it (*Elmer 5877*) 'differs less from *H. floribunda* than the numerous varieties of that species differ among themselves.

Tropical Australia and Malaya; not previously reported from the Philippines.

JUSTICIA Linn.

1. **J. procumbens** Linn. Sp. Pl. (1753) 15.

Pine region below 1,500 m, *C. M. Z. 16081.*

Widely distributed in the Philippines at low and medium altitudes. India and Ceylon to southern China, Malaya, and Australia.

RUBIACEÆ.

HEDYOTIS Linn.

1. **H. bartlingii** Merrill nom. nov.

Metabolos angustifolius DC. Prodr. 4 (1830) 436; *Sclerococcus* Bartl. l. c. syn. *Hedyotis angustifolia* Miq. Fl. Ind. Bat. 2 (1858) 182; F.-Vill. Nov. App. (1880) 107, non C. & S.

In the pine region, altitude about 1,400 m, *C. M. Z. 16214.*

This endemic species is represented by the type, which I have examined in the Prague herbarium, and also the following specimens: Province of Benguet, Baguio, *Williams 1880;* Province of Bulacan, near Norzagaray, *Yoder 247.*

2. **H. microphylla** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 239.

In the mossy forest above an altitude of 2,400 m, *C. M. Z. 16217, 18056, Merrill 6551.*

This endemic species is otherwise known only from the higher mountains of the Benguet-Lepanto region.

WENDLANDIA Bartl.

1. **W. glabrata** DC. Prodr. 4 (1830) 411.

Stream depressions in the pine region, below an altitude of 1,500 m, *C. M. Z. 18171, 18185, 18197.*

This species is apparently widely distributed in the Philippines; Tenasserim to southern China, Formosa, and Malaya.

MUSSAENDA Linn.

1. **M. benguetensis** Elm. Leafl. Philip. Bot. 1 (1906) 13.

In the pine region, ascending to an altitude of 1,700 m, *C. M. Z. 18165.*

Known only from the Benguet-Lepanto region.

RANDIA Linn.

1. **R. wallichii** Hook. f. Fl. Brit. Ind. 3 (1880) 113.

Stream depressions, altitude about 1,200 m, *C. M. Z. 18204.*

Widely distributed in the Philippines at low and medium altitudes; mountains of India to southern China, and Java.

COFFEA L.

1. **C. arabica** Linn. Sp. Pl. (1753) 172.

Extensively cultivated by the Igorots, especially in the river valleys of Benguet, its altitudinal range extending to at least 1,700 m, *C. M. Z. 18150.*

PSYCHOTRIA Linn.

1. **P. crispipila** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 240.

In the mossy forest, *C. M. Z. 18121, 18150.*

Known only from similar habitats on the higher mountains of the Benguet-Lepanto region.

2. **Psychotria macgregorii** Merrill sp. nov.

Arbuscula glabra circiter 4 m alta; foliis ellipticis vel elliptico-ovatis, usque ad 6.5 cm longis, leviter acuminatis, basi acutis, subcoriaceis, nervis utrinque circiter 9, subtus prominentibus, stipulis lanceolatis, 9 ad 12 mm longis; inflorescentiis terminalibus, brevibus, floribus subverticillatim dispositis, congestis; seminibus subhemisphaericis, laevibus, dorso nec longitudinaliter sulcatis nec rugosis.

A glabrous shrub about 4 m high. Branches terete, smooth, gray or brownish-gray. Leaves elliptic or ovate-elliptic, subcoriaceous, 3 to 6.5

cm long, 1.5 to 3 cm wide, the base acute, the apex shortly and usually rather sharply acuminate, somewhat shining when dry, the margins sometimes recurved; nerves about 9 on each side of the midrib, beneath prominent, anastomosing, the reticulations rather dense; stipules lanceolate, acuminate, deciduous, 9 to 12 mm long. Inflorescence terminal, short, 2 to 4 cm long, the flowers crowded, subverticillate at the apices of the rachis and the few branches. Flowers white, sessile. Calyx narrowly funnel-shapped, about 4 mm long, the mouth often slightly oblique, slightly and irregularly 5- or 6-toothed. Corolla about 6 mm long, the lobes 4, spreading or reflexed, ovate, obtuse, 4 mm long, 2.5 mm wide, the throat white-hairy. Anthers elliptic, 1 mm long. Style as long as the corolla, the arms 0.5 mm long. Fruit narrowly obovoid, 7 to 8 mm long, 5 mm in diameter, narrowed at the base, somewhat wrinkled when dry, tipped with the cylindric, persistent, about 1.5 mm long calyx-tube. Seeds 3.5 mm long, 3 mm wide, subhemispherical, not at all ridged or striate on the back.

In the mossy forest, altitude above 2,400 m, *Merrill 8495* (type), *McGregor 8854, C. M. Z. 18077, 18082.*

Apparently a distinct species and quite different from any of the previously described Philippine forms; it is well characterized by its prominently nerved leaves, rather dense and distinct reticulations, whorled sessile flowers and smooth, not ridged or grooved seeds. A closely allied form is represented by *C. M. Z. 16353*, from the same altitude and habitat, the branchlets ferruginous-pubescent.

PAEDERIA Linn.

1. **P. tomentosa** Bl. Bijdr. (1826) 968.

Stream depressions in the pine region, altitude about 1,500 m, *C. M. Z. 16204, 16215.*

Widely distributed in the Philippines at low and medium altitudes; India, Japan, and Malaya.

NERTERA Banks & Soland.

1. **N. depressa** Banks & Soland. ex Gaertn. Fruct. 1 (1788) 124, *t. 26.*

In the mossy forest above an altitude of 2,400 m, *C. M. Z. 16218, Merrill 6599.*

This species is widely distributed in the Philippines, mostly at high altitudes, and has been found on Mount Paraga, Province of Abra, (*Bur. Sci. 7065 Ramos*), Mount Data, District of Lepanto (*Merrill 4524*), various places in Benguet at higher altitudes (*Bur. Sci. 2796, 2863, 2498, 4372, 4453 Mearns, Bur. Sci. 5444 Ramos, Topping 77*), Mount Banajao, Province of Tayabas (*Whitford 937, Elmer 9190, Bur. Sci. 6077, 6576 Robinson*), Mount Pinatubo, Province of Zambales, (*Bur. Sci. 2609 Foxworthy*), Mount Halcon, Mindoro (*For. Bur. 4459 Merritt, Merrill 5614*), and Mount Apo, Mindanao, (*Copeland 1078*). It is somewhat variable in vegetative characters, but apparently a single species is represented. Whether or not it is the true *Nertera depressa* Banks & Solander, I am unable to determine. It may prove to be the same as *N. nigricarpa* Hayata, recently described from Mount Morrison, Formosa. It is reported from eastern Australia, Tasmania, New Zealand, South America, and apparently also Java, although Bentham expresses the opinion that the Javan form represents a distinct species.

GALIUM Linn.

1. **G. gaudichaudii** DC. Prodr. **4** (1830) 607.
Stream depressions, altitude about 1,500 m, *Merrill 6595.*
Eastern Australia and Tasmania.
2. **G. philippinense** Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 238.
On dry slopes, upper pine region, altitude about 2,000 m, *C. M. Z. 16333, Merrill 6521.*
Endemic, but closely allied to the widely distributed European and Asiatic *G. rotundifolium* L., and to *G. javanicum* Bl. of Java. The latter has been reduced by Hooker f. to *G. rotundifolium* L.

RUBIA Linn.

1. **R. cordifolia** Linn. Syst. ed. 12, **3** (1768) 229.
In stream depressions, altitude below 1,500 m, *C. M. Z. 16216, Merrill 6531.*
Widely distributed in the Philippines at medium and higher altiudes, variable; tropical Africa and Asia to northeastern Asia, Japan, and Java.

CAPRIFOLIACEÆ.

LONICERA Linn.

1. **L. rehderi** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 49.
Upper pine region, altitude about 2,000 m, *C. M. Z. 18113.*
Known only from the higher altitudes of the Benguet-Lepanto region.

SAMBUCUS Linn.

1. **S. javanica** Bl. Bijdr. (1825) 657.
Mossy forest, altitude 2,250 m, *C. M. Z. 18123.*
Widely distributed in the Philippines, especially at medium altitudes; India to southern China and Malaya.

VIBURNUM Linn.

1. **V. luzonicum** Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 310.
In the lower mossy forest, and in ravines in the pine region, *C. M. Z. 18164, Merrill 6534.*
Widely distributed in the Philippines at higher altitudes, very common in the Benguet-Lepanto region. An endemic species, but apparently closely allied to, and possibly not distinct from *V. erosum* Thunb. of Japan, China, and Formosa.

2. **V. odoratissimum** Ker in Bot. Reg. **6** (1820) *t. 456.*
Extending from an altitude of 1,300 m, in ravines in the pine region, to the lower parts of the mossy forest, *C. M. Z. 18182, 18131, 18205, McGregor 8859.*
Common throughout the Benguet-Lepanto region, and occurring also on mountains further south; eastern India to southern China, Formosa, the Riu Kiu Islands and Japan. Reported, with doubt, also from Celebes.

CUCURBITACEÆ.

MELOTHRIA Linn.

1. **M. mucronata** (Bl.) Cogn. in DC. Monog. Phan. **3** (1881) 608.
Lower pine region, *C. M. Z. 16091;* upper pine region and lower mossy forest, *Merrill 6566, McGregor 8900;* mossy forest, *C. M. Z. 16092.*
Widely distributed in the Philippines, its altitudinal range on Mount Pulog being from about 1,200 m to 2,250 m; India to Formosa, and Malaya.

2. **M. indica** Lour. Fl. Cochinch. (1790) 35.

Upper pine region, *Merrill 6581.*

Widely distributed in the Philippines; about the same extra-Philippine range as the preceding.

GYNOSTEMMA Bl.

1. **G. pedatum** Bl. Bijdr. (1825) 23.

Lower pine region, altitude about 1,200 m, *C. M. Z. 16145.*

Widely distributed in the Philippines at low and medium altitudes; India to Japan, south to Borneo, Sumatra, and Java.

CAMPANULACEÆ.

LOBELIA Linn.

1. **L. nicotianaefolia** Heyne in Roth Nov. Pl. Sp. (1821) 143; A. DC. Prodr. 7 (1839) 381; Clarke in Hook. f. Fl. Brit. Ind. 3 (1881) 427.

Mossy forest, altitude 2,250 m, *C. M. Z. 16101.*

This species has not previously been reported from the Philippines, and it is also represented by the following specimens, all from Luzon: District of Lepanto, *For. Bur. 5685 Klemme, For. Bur. 14479 Darling;* Province of Benguet, *Elmer 6066, Williams 1302, For. Bur. 15890 Bacani, Bur. Sci. 5864 Ramos, Bur. Sci. 4327 Mearns;* Province of Ilocos Sur, *For. Bur. 15689 Merritt & Darling;* Province of Zambales, Mount Tapulao, *Bur. Sci. 4994 Ramos.*

India (Deccan Peninsula), and Ceylon.

It is impossible to determine here, without a full series of Indian specimens for comparison, whether or not the Philippine plant is really specifically identical with Heyne's species; so far as descriptions go, however, the material agrees with that of *L. nicotianaefolia* Heyne, better than with that of any other species known from the Indo-Chinese region. The species is, however, not reported from eastern India, southern China, or Malaya, and the discontinuous distribution is some ground for belief that eventually the Luzon plant may be found to be distinct from the Indian one, or perhaps referable to some other species of the Indo-Chinese region.

PERACARPA Hook. f. & Th.

1. **P. luzonica** Rolfe in Kew Bull. (1906) 201.

Upper limits of the mossy forest, *Merrill 6496.*

Known only from the higher mountains of Benguet and Lepanto; a very interesting case of geographical distribution, the only other species of the genus, *P. carnosa* Hook. f. & Th., extending from the Himalayan region to Yunnan.

WAHLENBERGIA Schrad.

1. **W. bivalvis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 242.

Upper pine region, altitude about 2,000 m, Merrill 6523, and open grass lands above the mossy forest, altitude about 3,000 m, *C. M. Z. 16102.*

An endemic species, common in the Benguet-Lepanto region, with the general appearance of the widely distributed *W. gracilis* DC., but differing, according to descriptions of the latter, in having 2-valved instead of 3-valved capsules.

COMPOSITÆ.

ETHULIA Linn.

1. **E. conyzoides** Linn. Sp. Pl: ed. 2 (1763) 1171.

Lower parts of the mossy forest, *C. M. Z. 16124.*

In the Philippines confined to the higher mountains of the Benguet-Lepanto region; tropical Africa to Bengal, Assam, and Silhet.

CENTRATHERUM Cass.

1. **C. fruticosum** Vid. Rev. Pl. Vasc. Filip. (1886) 159.

Stream depressions, pine region, altitude about 1,500 m, *C. M. Z. 16085.*

Widely distributed in the pine regions of the Benguet-Lepanto area, on some mountains further south, and near sea level in the Batanes Islands; closely allied to *C. muticum* Less. of tropical America and Australia; endemic.

VERNONIA Schreb.

1. **V. philippinensis** Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 312.

In ravines, pine region, altitude about 1,300 m, *C. M. Z. 16116.*

At medium altitudes, Luzon to Mindanao, not common; endemic.

ELEPHANTOPUS Linn.

1. **E. mollis** H. B. K. Nov. Gen. & Sp. Pl. 4 (1820) 26.

Abundant throughout the pine region, *C. M. Z. 16086.*

Introduced from tropical America and now thoroughly naturalized; abundant and widely distributed in the Philippines.

AGERATUM Linn.

1. **A. conyzoides** Linn. Sp. Pl. (1753) 839.

Common in the pine region, *C. M. Z. 16337.*

Very abundant in the Philippines, from sea level to high altitudes; Tropics of the world, but probably originating in tropical America.

EUPATORIUM Linn.

1. **E. benguetense** C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 217.

Mossy forest above 2,250 m, *C. M. Z. 16084, Merrill 6555.*

Known only from higher altitudes in the Benguet-Lepanto region.

MIKANIA Willd.

1. **M. scandens** (Linn.) Willd. Sp. Pl. 3 (1800) 1743.

In ravines, pine region, altitude about 1,200 m, *C. M. Z. 16106.*

Widely distributed in the Philippines at low and medium altitudes; Tropics of the world.

SOLIDAGO Linn.

1. **S. virgaurea** Linn. Sp. Pl. (1753) 880.

Upper pine region, extending to the lower limits of the mossy forest, *C. M. Z. 16109, 16117, 16179, Merrill 6547.*

A characteristic plant of the upper pine region of the Benguet-Lepanto region, but otherwise not known from the Philippines; Europe, temperate North America, temperate Asia to the Himalayan region and Khasia Mountains, southern China, Japan, and Formosa.

DICHROCEPHALA DC.

1. **D. latifolia** (Lam.) DC. Prodr. 5 (1836) 372.

Upper pine region, extending to the lower limits of the mossy forest, *C. M. Z. 16178, Merrill 6583.*

Widely distributed in the Philippines at medium and higher altitudes; tropical and subtropical Asia and Africa.

2. **D. chrysanthemifolia** (Bl.) DC. in Wight Contrib. (1834) 11; Prodr. 5 (1836) 372.

Upper pine region, *Merrill 6522.*

Known from the Philippines only from high altitudes in the Benguet-Lepanto region; about the same extra-Philippine range as the preceding species.

MYRIACTIS Less.

1. **M. humilis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 244.

In the mossy forest, *Merrill 6509,* and at base of cliffs in the summit grass lands, *C. M. Z. 16114.*

Higher mountains of the Benguet-Lepanto region, also on Mount Banajao, Province of Tayabas, Luzon; endemic.

ASTER Linn.

1. **A. trinervius** Roxb. Hort. Beng. (1814) 61, nomen, Fl. Ind. 3 (1832) 433; Hook. f. Fl. Brit. Ind. 3 (1881) 252.

In the pine region, altitude about 1,500 m, *C. M. Z. 16122.*

Central and western Himalaya, Khasia Mountains, China, and Japan; not previously reported from the Philippines.

The number cited above, so far as our mounted specimen goes, agrees closely with Roxburgh's species as interpreted by Hooker f.; some of the duplicates distributed under this number may have been referable to *Aster philippinensis* Moore, a quite different endemic species.

ERIGERON Linn.

1. **E. linifolius** Willd. Sp. Pl. 3 (1800) 1955.

Common in the pine region, *C. M. Z. 16108, 16119, Merrill 6515.*

Common and widely distributed in the Philippines; a native of the Mediterranean region, now widely distributed in subtropical and tropical parts of the world.

CONYZA Less.

1. **C. japonica** (Thunb.) Less. Syn. Comp. (1832) 204.

Upper pine region, *Merrill 6540.*

In the Philippines known only from higher altitudes of the Benguet-Lepanto region; Afghanistan to Japan, southward to Malaya.

2. **C. viscidula** Wall. Cat. (1828) no. 3006; DC. Prodr. 5 (1836) 383.

In the pine region, altitude about 1,400 m, *C. M. Z. 16336.*

Widely distributed in the Philippines at low and medium altitudes, but not common; India to Java, New Caledonia, and Australia.

BLUMEA DC.

1. **B. appendiculata** (Bl.) DC. Prodr. 5 (1836) 447.

Upper pine region, *C. M. Z. 18116,* and in the lower mossy forest, *Merrill 6511.*

Widely distributed in the Philippines at medium and higher altitudes, but not common; Java.

2. **B. mollis** (Don) Merrill comb. nov.

Erigeron molle Don Prodr. (1825) 172.

Conyza bifoliata Chamisso & Less. in Linnaea **6** (1831) 135.

Blumea chamissoniana DC. Prodr. **5** (1836) 454.

Blumea wightiana Hook. f. Fl. Brit. Ind. **3** (1881) 261, non DC.

In stream depressions, pine region, altitude 1,300 m, *C. M. Z. 16334.*

Widely distributed in the Philippines at low and medium altitudes; India to southern China, Malaya, Australia, and tropical Africa.

What is apparently the oldest specific name is here adopted, but in accepting this name I have followed the authority of Hooker f., who made the reduction. According to Hooker f. *Blumea trichophora* DC., *B. parvifolia* DC., and *B. phyllostachya* DC., the former based at least in part, on *Erigeron molle* Don, the other two on *nomina nuda* of Wallich's "Catalogue," sub *Conyza,* as well as *Blumea leschenaultiana* DC., are all synonyms of *Blumea wightiana.* I have examined the type of *Blumea chamissoniana* DC. in the Berlin Herbarium, as well as the duplicate in the DeCandolle Herbarium, and also the type of *B. wightiana* DC. in the latter institution. The specimen on which *Blumea wightiana* DC. was based does not appear to me to specifically identical with the specimens so named in the Kew Herbarium, on which the English botanists have based their conception of *Blumea wightiana.* Prain [16] in discussing the Wallichian Herbarium, as distributed, in connection with the early volumes of the "Prodromus" warns all botanists, who wish their results to be accurate, to place no confidence in the Wallichian name for a species in any of the families treated by DeCandolle before the Wallichian Herbarium was issued, without first confirming it by comparison with the specimen so named in the "Prodromus" Herbarium, as Doctor Wallich placed no numbers on the sheets he originally sent to DeCandolle, and many of the identifications of DeCandolle's species were manifestly made by Dr. Wallich without referring to either DeCandolle's descriptions or specimens.

3. **B. incisa** (Elmer) Merrill comb. nov.

Pluchea incisa Elmer Leafl. Philip. Bot. **1** (1908) 358.

Herba erecta vel subscandens; foliis usque ad 8 cm longis, 2.5 cm latis, subsessilibus, superioribus sensim minoribus, subcoriaceis vel chartaceis, scabridis, leviter pubescentibus, acuminatis, irregulariter lobatis vel incisis; capitulis circiter 1 cm longis, breviter pedicellatis vel subsessilibus, squamis imbricatis, pubescentibus.

Upper pine region, altitude about 2,000 m, *C. M. Z. 16123.*

This species was described by Mr. Elmer as a *Pluchea,* based on a specimen collected by himself in Benguet, *no. 8396.* It appears to me to be a *Blumea,* and closely allied to *B. chinensis* (Linn.) DC., rather than a *Pluchea,* and is accordingly here transferred to the former genus. Mr. Elmer considers it to be allied to *Pluchea scabrida* DC., but the material identified by him as *Pluchea scabrida,* I consider to be referable to *Blumea,* a species very closely allied to if not identical with *Blumea chinensis* (L.) DC. *Pluchea scabrida* DC., the type of which I have examined in the DeCandolle Herbarium, is apparently only a very pubescent form of *Pluchea indica* (Linn.) Less., although placed by DeCandolle in the section *Hebephora.*

Known only from high altitudes in Benguet.

[16] Journ. As. Soc. Beng. **66**[2] (1897) 393.

MERRITTIA Merrill gen. nov.

Capitula heterogama, disciformia, androgyna, floribus in ambitu ♀, fertilibus, pluriseriatis, numerosis, disci ♂ paucis. Involucrum subcampanulatum, bracteis pluriseriatis, angustis, exterioribus gradatim minoribus. Receptaculum planum, dense pilosum. Corollae ♀ filiformes, minute 3-dentatae, stylis suis breviores; ♂ regulares, tubulosae, limbo apice parum ampliato 5-dentato. Antherae basi sagittatae, auriculis caudato-acuminatis, apice appendiculatae. Styli fl. ♀ exserti, ramis linearibus; styli fl. ♂ vix exserti, subintegri, apice minutissime divisi. Achenia parva, plus minus compressa, obscure striata. Pappi setae tenues, uniseriatae, liberae, scaberulae. Herba erecta, perennis, plus minus pubescens. Folia alterna, ampla, irregulariter lyrato-lobata, dentata, sessilia vel subsessilia. Capitula mediocria, in paniculis terminalibus oblongis disposita. Achenia pilosa.

Merrittia benguetensis (Elm.) Merrill comb. nov.

Senecio benguetensis Elm. Leafl. Philip. Bot. 1 (1906) 152.

In the mossy forest above an altitude of 2,250 m, *C. M. Z. 16113, Merrill 6586.* Otherwise represented by the following specimens, all from Benguet Province, Luzon: Mount Tonglon (Santo Tomás) *Elmer 6247* (type); Pauai, *Merrill 4755;* Balangabang, *Bur. Sci. 5896 Ramos;* without definite locality, *Loher 3636* (in herb. Kew.).

The new genus here proposed I refer with considerable confidence to the tribe *Inuleae,* placing it next to *Blumea* in the *Inuleae-Plucheinae* as defined by Hoffmann in Engler & Prantl's "Natürlichen Pflanzenfamilien." To me the plant has much the aspect of some species of *Blumea,* while in floral structure it approximates that of *Blumea* and allied genera. It differs from *Blumea* and other genera in the *Inuleae-Plucheinae* especially in its rather densely pilose receptacles, a character quite at variance with the genera to which *Merrittia* seems otherwise to be allied.

J. R. Drummond, Esq., who kindly assisted me in the identification of some of the Philippine *Compositae* in the Kew herbarium, examined a part of the material above cited, and the following is quoted from his report on *Senecio benguetensis* Elm.

"This plant is remote from all the typical forms of the genus, to which Mr. Elmer has referred it, by the involucral structure; it is true that certain species now included under *Senecio* have pluriseriate and imbricating involucral bracts, but assuming that those species should remain in their present position, which seems to be far from certain, the characters of the stigma in the ♂ florets of the Luzon plant would exclude it from the tribe of *Senecionideae* as defined in the Genera Plantarum."

Mr. Drummond has suggested that the plant should be referred to the subtribe *Baccharideae* of the *Asteroideae,* but I consider that the character of the tailed anthers excludes it from that tribe.

The ♂ flowers (disk-flowers) vary in number from 3 to 9, the corolla-teeth frequently being nearly 1.5 mm in length. The styles are entire or minutely cleft at the apex, the arms being less than 0.5 mm in length. The style-arms of the ♀ flowers are papillate and about 1.5 mm in length. The involucral-scales are several-seriate, the outer ones being from 1 to 1.5 mm long, the inner gradually longer, the innermost about 7 mm long and 1 mm wide.

This proposed new genus is dedicated to Mr. M. L. Merritt, coauthor of the present paper, and a forester for several years in the service of the Philippine Government. Mr. Merritt made extensive botanical collections in the Archipelago, especially in the Island of Mindoro, in connection with the prosecution of his official duties, and was also a member of the Forestry Bureau party that made the ascent of Mount Pulog in January, 1909.

LAGGERA Sch.-Bip.

1. **L. alata** (Don) Sch.-Bip. ex Oliv. in Trans. Linn. Soc. **39** (1873) 94.

In the lower pine region, altitude about 1,300 m, *C. M. Z. 16118.*

At medium altitudes in the Philippines, not common; India to southern China, Java, and tropical Africa.

ANAPHALIS DC.

1. **A. adnata** (Wall.) DC. Prodr. **6** (1837) 274.

In the pine region, altitude from 1,600 to 1,900 m, *C. M. Z. 16120.*

In the Philippines known only from high altitudes in the Benguet-Lepanto region; mountains of northern India from Simla to Khasia, and in Martaban, Burma, and Kwangtung.

2. **A. contorta** (Don) Hook. f. Fl. Brit. Ind. **3** (1881) 284.

In the upper pine region, altitude about 2,000 m, and above the mossy forest on the open grassy slopes, altitude about 2,800 m, but not in the mossy forest, *C. M. Z. 16127, Merrill 6486, McGregor 8901.*

Like the preceding species, known from the Philippines only from high altitudes in the Benguet-Lepanto region, its extra-Philippine range about the same, but not known from southern China.

GNAPHALIUM Linn.

1. **G. hypoleucum** DC. in Wight Contrib. (1834) 21; Prodr. **6** (1837) 222.

Near the lower border of the mossy forest, *C. M. Z. 16121, Merrill 6572.*

In the Philippines confined to the Benguet-Lepanto region, at higher altitudes; Japan to southern China, the mountains of India and Abyssinia.

2. **G. japonicum** Thunb. Fl. Jap. (1784) 311.

Upper pine region and in the lower part of the mossy forest, *C. M. Z. 16126, Merrill 6541.*

In the Philippines known only from the high mountains of the Benguet-Lepanto region, and from Mount Banajao, Luzon; Japan and China, southward to Australia and New Zealand.

CARPESIUM Linn.

1. **C. cernuum** Linn. Sp. Pl. (1753) 859.

Lower parts of the mossy forest, *Merrill 6563.*

Known in the Philippines only from high altitudes in the Benguet-Lepanto region; central Europe through the Himalayan region to China and Japan.

SIEGESBECKIA Linn.

1. **S. orientalis** Linn. Sp. Pl. (1753) 900.

Upper pine region and lower mossy forest, *C. M. Z. 16110.*

At medium and higher altitudes in the Philippines; cosmopolitan in warm countries, and extending into some temperate regions.

SPILANTHES Linn.

1. **S. grandiflora** Turcz. in Bull. Soc. Nat. Mosc. 24[1] (1851) 183.

Upper pine region, extending to the lower border of the mossy forest, *C. M. Z. 16197, Merrill 6517.*

Known in the Philippines only from medium and higher altitudes in northern Luzon; northern Australia, Queensland, and New South Wales.

BIDENS Linn.

1. **B. pilosa** Linn. Sp. Pl. (1753) 832.

Upper pine region, *C. M. Z. 16083, Merrill 6548.*

Widely distributed in the Philippines at medium and low altitudes; cosmopolitan in the Tropics, extending into some temperate regions.

ARTEMISIA Linn.

1. **A. capillaris** Thunb. Fl. Jap. (1784) 309.

In the pine region, altitude about 1,300 m, *C. M. Z. 18179.* Ig., *paldid.*

Known in the Philippines only from the Benguet-Lepanto region; Manchuria, Kamtschatka, and Japan to southern China, and Formosa.

GYNURA Cass.

1. **G. vidaliana** Elmer Leafl. Philip. Bot. 1 (1906) 144.

In the pine region, altitude about 1,450 m, *C. M. Z. 16340.*

Common on the mountains of the Benguet-Lepanto region, also found on Mount Pinatubo, and Mount Tapulao, Zambales Province, and Mount Arayat, Pampanga Province, Luzon, and on Mount Victoria, Palawan; endemic.

2. **Gynura macgregorii** Merrill sp. nov.

Herba erecta, glabra; foliis chartaceis, grosse irregulariter sinuato-dentatis, dentibus acuminatis; inferioribus petiolatis, utrinque acuminatis, superioribus sessilibus, cordatis; capitulis 2 cm longis, floribus aurantiacis.

An erect glabrous herb, more or less branched, the base somewhat woody, reaching a height of about 1 m. Leaves various, the lower ones oblong-lanceolate, chartaceous, 10 to 15 cm long, 2 to 5 cm wide, dull when dry, paler beneath but scarcely purplish, the apex sharply acuminate, the base decurrent-acuminate, the margins coarsely and irregularly sinuate-dentate, acuminate; nerves 6 to 9 on each side of the midrib, rather distinct, scarcely anastomosing, the reticulations very few, obscure; petioles 1.5 to 2 cm long: intermixed with these petioled leaves are numerous, small, subovate, sessile or subsessile, irregularly sinuate-toothed leaves about 2 cm long, simulating stipules: the upper leaves are sessile, much smaller than the lower petioled ones, variously toothed or even lobed, broad and cordate at the base and somewhat clasping the stem. Panicles lax, glabrous except the slightly pubescent peduncles, the branches and peduncles subtended by small, irregular bracts. Heads about 2 cm long, glabrous, each peduncle with several, linear, 6 to 8 mm long bracteoles scattered along its upper part, and

more numerous similar ones subtending the involucre. Involucral bracts about 12, linear, about 13 mm long, 2 to 2.5 mm wide, glabrous, or very slightly pubescent at the tips, margins hyaline, apex acute or acuminate. Flowers orange-yellow, about 60 in each head. Achenes glabrous, nearly 2.5 mm long. Corolla slender, tubular, 1.5 cm long, narrowly-campanulate at the apex, and with 5 oblong, 1.5 mm long lobes. Anthers 2.3 mm long. Style-arms spreading or recurved, 3.5 mm long. Pappus white, copious, nearly as long as the corolla-tube. Disk shortly fimbrillate.

In the mossy forest above 2,250 m altitude, *Bur. Sci. 8876 McGregor*, July 3, 1909 (type), *Merrill 6579*, May, 1909. Pauai, *Bur. Sci. 4336 Mearns*.

Among the Philippine species, this proposed new one is most closely allied to *Gynura vidaliana* Elmer, but is at once distinguished from that species by being almost entirely glabrous, as well as by its sessile, reduced, and usually cordate upper leaves. In many respects it similates *Gynura sarmentosa* DC., but is at once distinguished from that species by its erect habit, larger heads, and larger leaves. It is manifestly allied to the extra-Philippine group represented by *Gynura nitida* DC., *G. angulosa* DC., *G. pseudo-china* DC., and *G. bicolor* DC., but, so far as I can determine from the descriptions, is apparently distinct from all.

SENECIO Linn.

1. **S. confusus** Elmer Leafl. Philip. Bot. 1 (1906) 153.

In the pine region, extending into the lower parts of the mossy forest, *C. M. Z. 16115, Merrill 6589*.

Confined to the higher altitudes of the Benguet-Lepanto region.

This species is apparently the Philippine representative of *Senecio scandens* Ham., which extends from northern India to Ceylon and south-eastern China, and may at a later date have to be reduced to that species.

2. **S. luzoniensis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 245.

Rather common in the mossy forest, extending down ravines into the upper limits of the pine region, *C. M. Z. 16111, Merrill 6567*.

A species known only from high altitudes of the Benguet-Lepanto region, and the mountains of Zambales.

As the preceding species is apparently the Philippine representative of *Senecio scandens*, so the present one apparently is our representative of the widespread *Senecio nemorensis* Linn., which extends from central and northern Europe to Kamtschatka, Japan, and China.

EMILIA Cass.

1. **E. pinnatifida** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 243.

In the pine region, *C. M. Z. 16196*.

Characteristic of open pine forests in the Benguet-Lepanto region; endemic.

CIRSIUM Scop.

1. **Cirsium luzoniense** Merrill sp. nov.

Cnicus wallichii Rolfe in Journ. Bot. 23 (1885) 214; Vidal Rev. Pl. Vasc. Filip. (1886) 164, non Hook. f.

Cirsium wallichii Elm. Leafl. Philip. Bot. 1 (1906) 178, non DC.

Cnicus argyracanthus F.-Vill. Nov. App. (1882) 353, non DC.

Planta stricta, erecta, 40 ad 80 cm alta; foliis sessilibus, lanceolatis vel oblongo-lanceolatis, valde sinuato-lobatis, lobis dentibusque valde spinosis. Capitulis circiter 2.5 cm diametro; bracteis pluriseriatis, exterioribus parvis, apice spinosis, interioribus gradatim longioribus, spinosis vel acuminatis, vix dilatatis, vix patulis; floribus ♀ circiter 2 cm longis.

A strict, erect, stout perennial reaching a height of nearly 1 m, often much smaller, with few short branches bearing the heads in the upper part. Stems striate, more or less densely clothed with brownish, soft, weak hairs, the under surfaces of the leaves also with similar hairs. Leaves alternate, sessile, the lower ones often 30 cm long, 8 cm wide, frequently much smaller, lanceolate to oblong-lanceolate in outline, prominently sinuate-lobed, the lobes extending nearly to the midrib, each lobe with few large and more numerous smaller teeth, these teeth and the lobes terminating in sharp, slender, stout spines, the spines terminating the lobes and larger teeth often 1 cm long, the lobes about 12 on each side of the midrib. The uppermost leaves much reduced and very spiny, especially those subtending the heads. Heads solitary, terminating the stems and branches, about 2.5 cm in diameter, ovoid or subglobose. Flowers pale-purple to nearly white, the ♀ ones about 2 cm long. Outer involucral bracts about 7 mm long and 1.5 mm wide, lanceolate, prominently and sharply awned-acuminate, the inner ones gradually longer but with shorter awns, the innermost about 18 mm long and 2 mm wide, their apices not at all inflated, strict, not or but slightly spreading, acuminate, shortly awned, more or less scarious or nearly glabrous. Achenes oblong, smooth, 4 mm long, pappus-hairs about 12 mm long, white. Corolla 16 mm long, the lower half very slender, then abruptly enlarged, the enlarged portion split for one-half its length into 5 narrow lobes. Anthers 6 mm long, the filaments scarious.

A species very widely distributed in the Benguet-Lepanto region and also found on Mount Banajao, most of the material here considered previously having been referred in our herbarium to *Cirsium wallichii* DC. I am now of the opinion that the Philippine plant is specifically distinct from the Himalayan form, and it is accordingly here described as new. From DeCandolle's species, as described, our specimens differ especially in the inner involucral bracts not being at all dilated, and not or but slightly spreading. *Cirsium luzoniense* is represented by the following specimens, all from Luzon:

Province of Benguet, Mount Pulog, *For. Bur. 16125 Curran, Merritt, & Zschokke, Merrill 5692, Bur. Sci. 8872 McGregor;* Pauai, *Bur. Sci. 4339, 4493 Mearns, Merrill 4745, For. Bur. 14429 Darling;* Mount Tonglon (Santo Tomas), *Elmer 6278, Williams 1981* (type), *For. Bur. 4962 Curran:* Province of Laguna, Mount Banajao, *Bur. Sci. 6064 Robinson, Bur. Sci. 2391 Foxworthy:* Bontoc Subprovince, Bauco, *Vanoverbergh 209.*

AINSLIAEA DC.

1. **A. reflexa** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 242.

Common in the mossy forest, but not extending below or above its limits, *C. M. Z. 16195, Merrill 6498.*

Widely distributed on the higher mountains of the Benguet-Lepanto region, also on Mount Banajao, Province of Laguna, Luzon, and on Mount Halcon, Mindoro; Formosa.

SONCHUS Linn.

1. **S. arvensis** Linn. Sp. Pl. (1753) 793.

In the pine region, generally a weed in camote fields, *C. M. Z. 16107, Merrill 6545.*

Known in the Philippines only from medium and high altitudes in northern Luzon; widely distributed in temperate and subtropical regions of the world, its original home uncertain.

LACTUCA Linn.

1. **L. dentata** (Thunb.) C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 218.

Common in the pine region, extending into the lower part of the mossy forest, *C. M. Z. 16112, Merrill 6546.*

Abundant in the Benguet-Lepanto region, and on higher mountains southward to Mount Apo, Mindanao; Japan to southern China and Formosa.

CREPIS Linn.

1. **C. japonica** (Linn.) Benth. Fl. Hongk. (1861) 194.

In the lower parts of the mossy forest, *Merrill 6571.*

Widely distributed in the Philippines at medium and higher altitudes; India to Japan, southward to Malaya and Australia, also in Mauritius and southern Africa.

ILLUSTRATIONS.

PLATE I. Chart showing the daily range of temperature on Mount Pulog, January 3 to 9, 1909.

II. Panorama from the summit of Mount Pulog, from the northeast through the east, to the southwest.

III. Continuation of Plate II, panorama from the southwest to the northeast. (Foreground in the center lost by raising the camera too much.)

IV. Extreme summit of Mount Pulog, showing the characteristic grass-covered upper slopes.

MAP.

Map showing the location of Mount Pulog, and the neighboring mountains, from Mount Tonglon and Mount Ugo north to Mount Data. Prepared under the direction of Maj. George P. Ahern, Director of Forestry, from surveys made by Mr. Charles Benson, of the Bureau of Lands, and Messrs. H. M. Curran, M. L. Merritt, and T. C. Zschokke, of the Bureau of Forestry.

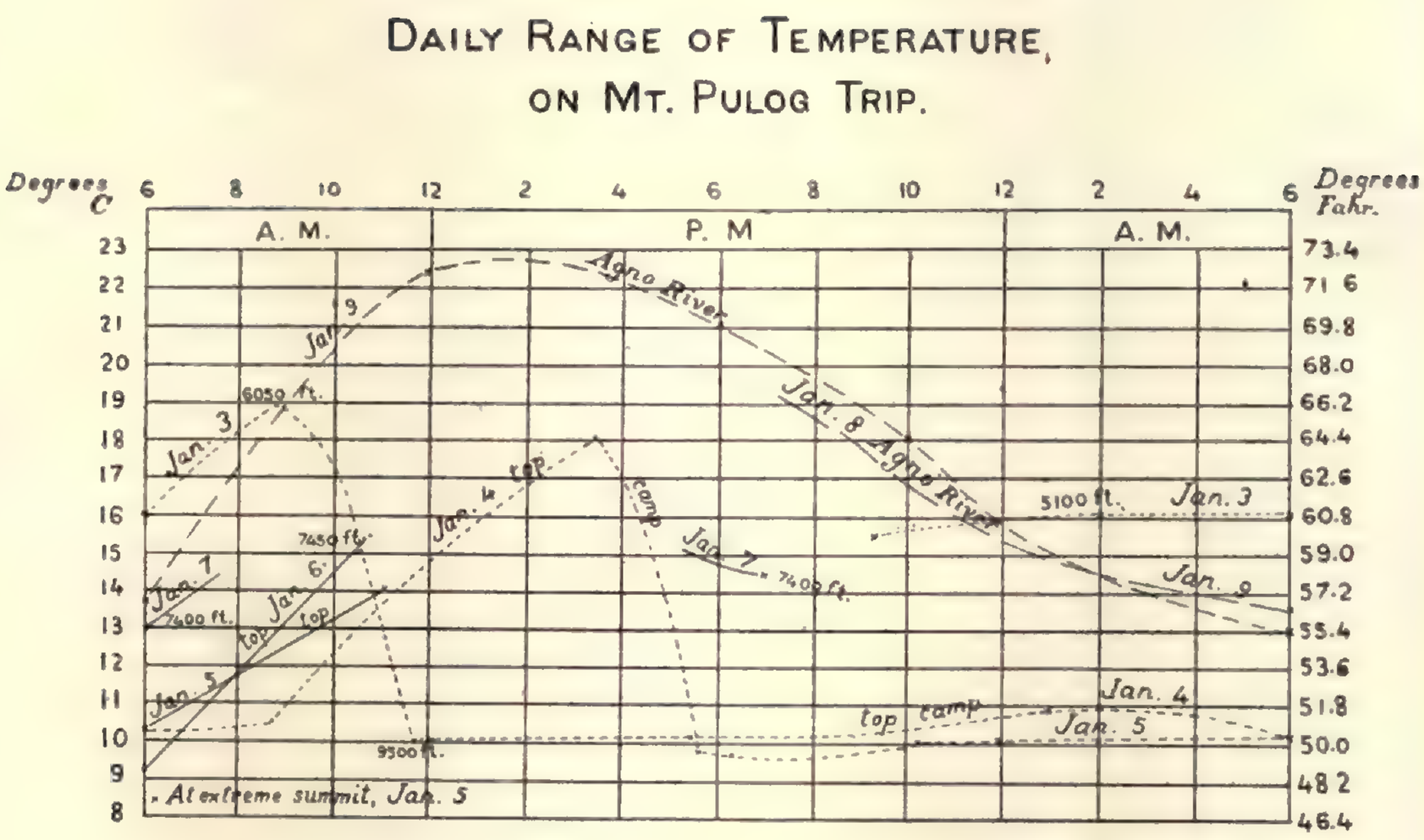
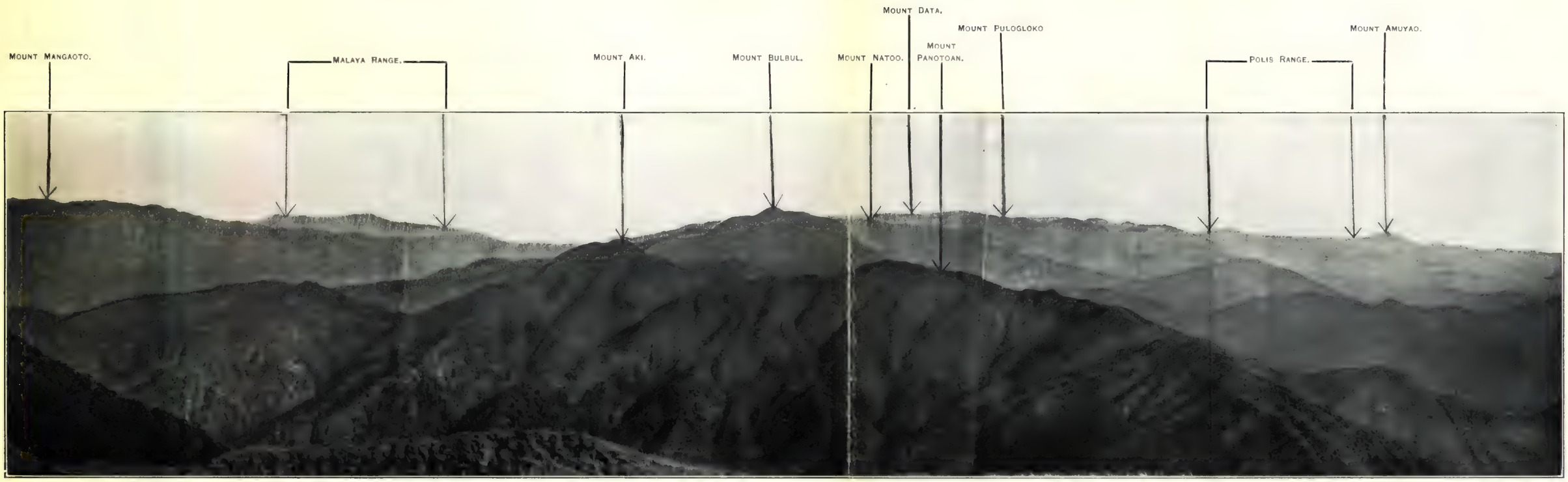

DAILY RANGE OF TEMPERATURE,
ON MT. PULOG TRIP.
Degrees C
Degrees Fahr.
6 8 10 12 2 4 6 8 10 12 2 4 6
A. M.
P. M
A. M.
23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8
73.4 71 6 69.8 68.0 66.2 64.4 62.6 60.8 59.0 57.2 55.4 53.6 51.8 50.0 48 2 46.4
Agno River
Jan. 8 Agno River
Jan. 9
Jan. 1
7400 ft.
Jan. 3
6050 ft.
Jan. 5
Jan. 6
7450 ft.
top
Jan. 4
top
camp
Jan. 7
7400 ft.
5100 ft.
Jan. 3
Jan. 4
top
camp
Jan. 5
9500 ft.
* At extreme summit, Jan. 5

PLATE I.

NORTH.



WEST.

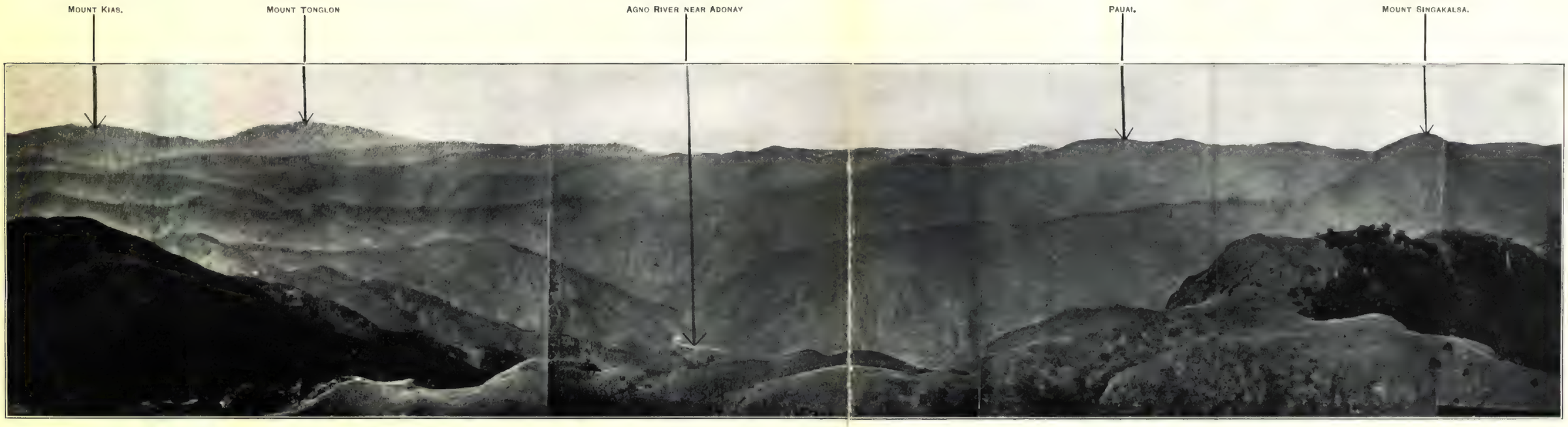
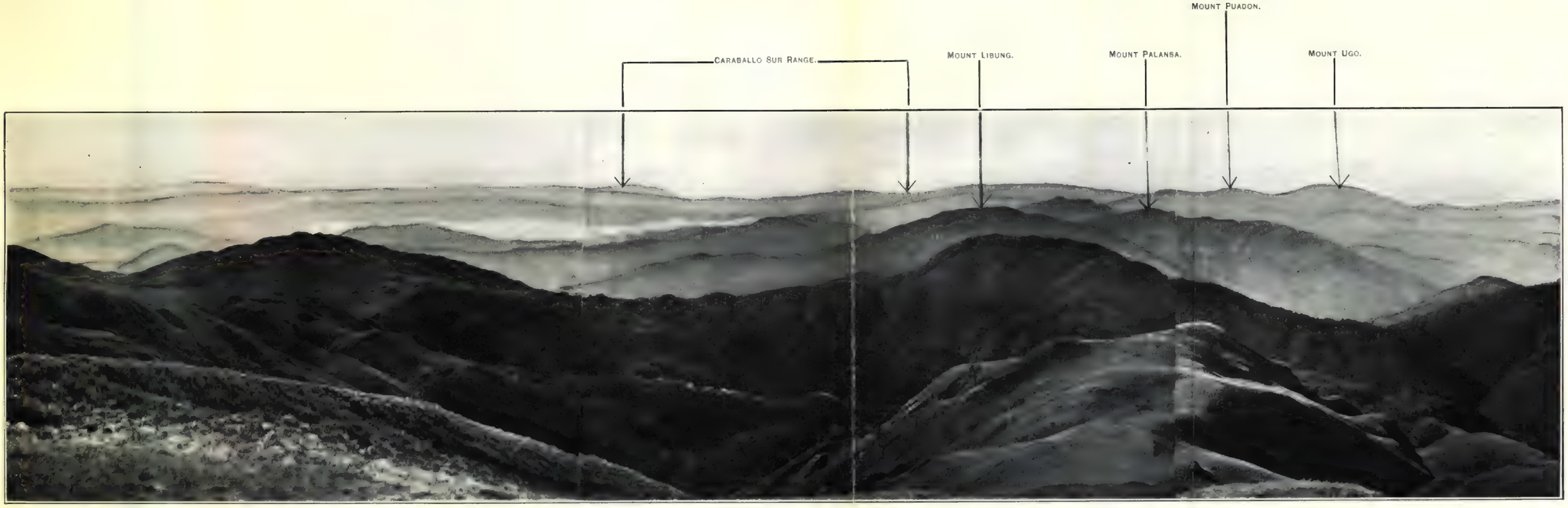


PLATE II.

SOUTH.



EAST

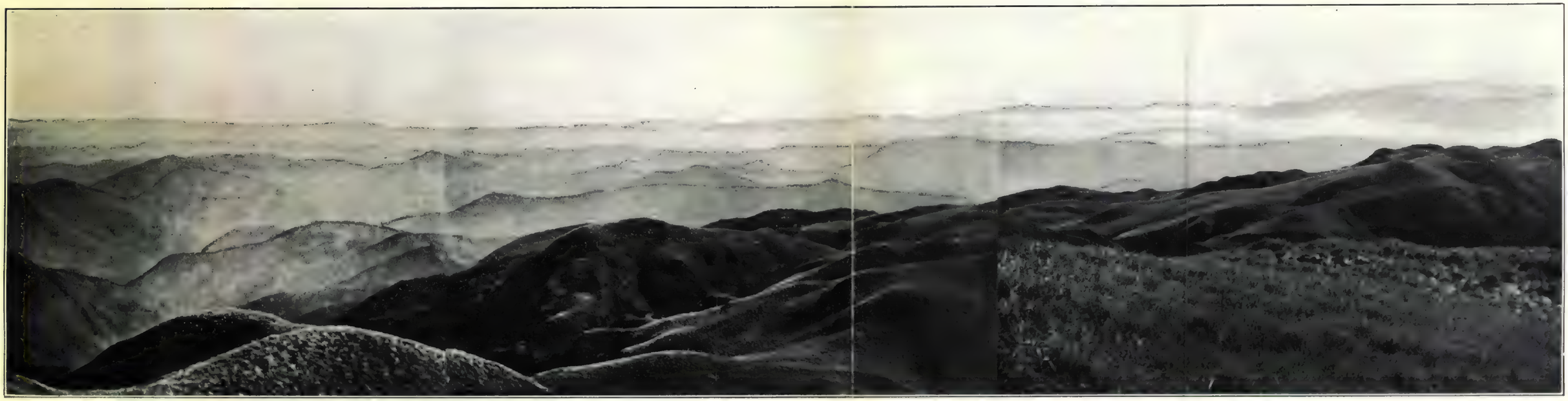
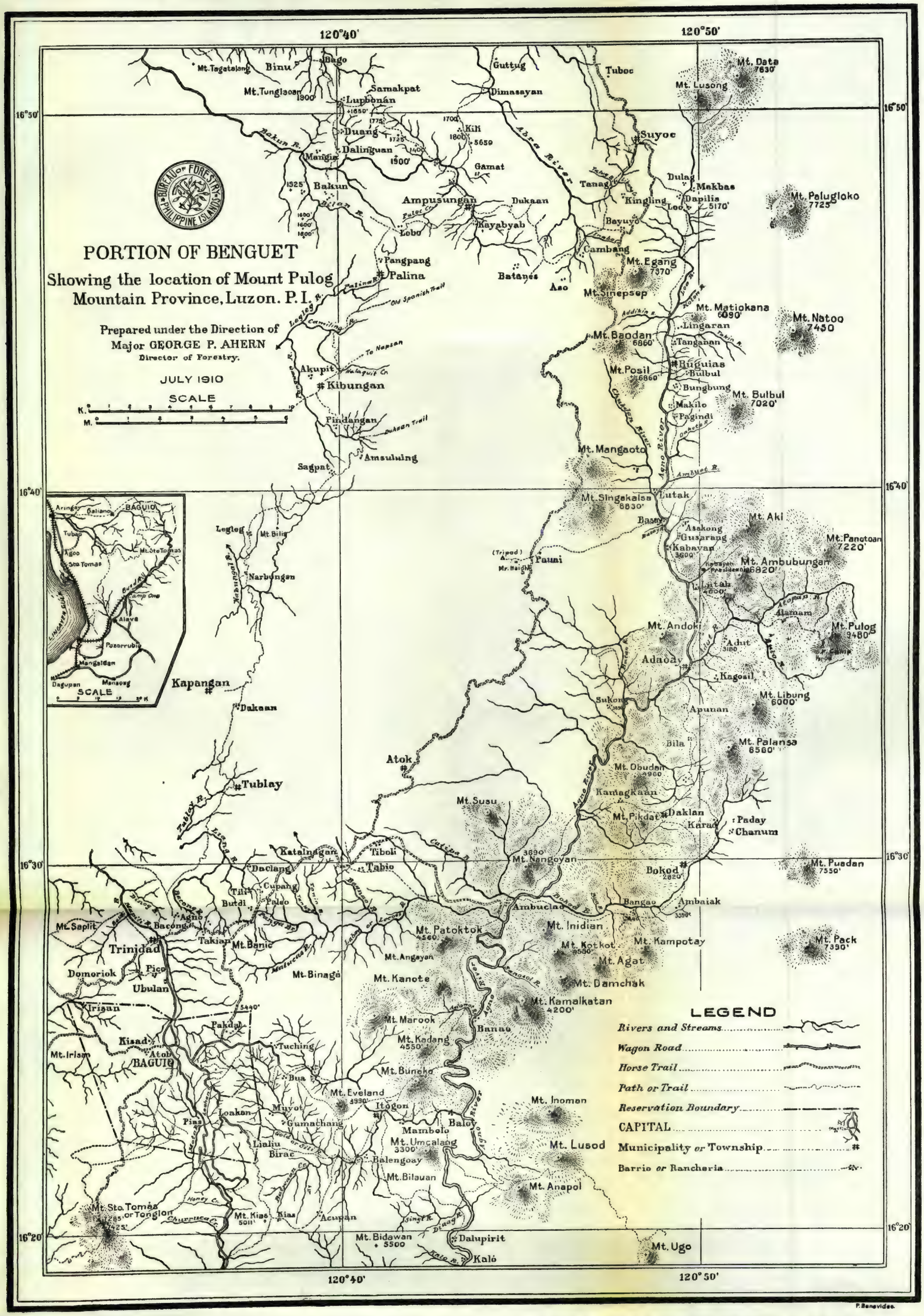


PLATE III.

PLATE IV.



MAP SHOWING THE LOCATION OF MOUNT PULOG, AND THE NEIGHBORING MOUNTAINS, FROM MOUNT TONGLON AND MOUNT UGO NORTH TO MOUNT DATA.

PHILIPPINE JOURNAL OF SCIENCE, C. BOTANY.
Vol. V, No. 5, November, 1910.

A REVISION OF PHILIPPINE PIPERACEAE.

By C. DE CANDOLLE.

(Geneva, Switzerland.)

When I undertook this revision, the total number of *Piperaceae* known to exist in the Philippines amounted to thirty species; it now reaches one hundred and twenty-five, of which twenty-two species are *Peperomia,* and one hundred and three are *Piper.* This large increase testifies to the great activity of the American botanists who are pursuing the scientific exploration of the Archipelago.

For the opportunity to prepare the present paper I feel particularly indebted to Mr. Merrill, botanist, Bureau of Science, who has kindly put at my disposal the rich materials deposited in the Herbarium of that institution. Mr. A. D. E. Elmer has also greatly helped me by sending numerous specimens collected by himself, to which he has added instructive annotations. The novelties in Mr. Elmer's collection have been fully described in his "Leaflets of Philippine Botany," [1] and in the present paper they are merely mentioned in their proper places among the other Philippine *Piperaceae,* except in the case of nine species that were based partly on material collected by Mr. Elmer, and partly on material in the Herbarium of the Bureau of Science, where the descriptions are repeated.

However large may appear the number of new species proposed in the following pages, it is probable that many more are still to be discovered in the Philippines. It is, moreover, highly desirable that male and female plants should be found to match with the too numerous species which are, as yet, known only by specimens of one or the other sex.

While studying the abundant materials of the recent collections, I was much surprised at finding that such a remarkable type as *Piper Rhyncholepsis,* formerly described and figured by Miquel as a distinct genus (*Rhyncholepsis* Miq.), has not been met with again by any of the modern explorers. I have also looked in vain in their collections for *Piper longum* L., the presence of which in the Archipelago rests, so far, on a single specimen contained in my own herbarium, and probably obtained from that of Thibaud.

[1] Philippine Piperaceae l. c. 3 (1910) 755–785 (Article 44).

Most of the Malayan *Piperaceae* are missing in the Philippines, as is also the case with those of New Guinea, Samoa, and Viti, of which I have just made a special study. In fact the Philippines certainly possess a very large number of endemic *Piperaceae*. While a great majority of the species seem to be narrowly localized, it is interesting to note that some are, on the contrary, widely spread in the various Islands. Striking examples of widely distributed but endemic species are furnished by such species as *Piper marivelesanum, P. albidirameum, P. abbreviatum,* and *P. pseudochavica; Piper corylistachyon,* a species which has hitherto been known only from the Philippines, and which is well characterized by the structure of its anthers, is also disseminated all over the Archipelago, but it is not strictly endemic, one of its forms having been recently collected in New Guinea, while *Piper Korthalsii* Miq., which I have here made the type of a new section of the genus, is very widely distributed in the Philippines, and is also found in Sumatra.

All measurements mentioned in this revision are taken from dried specimens. The foliar characters indicated in the diagnoses and keys always refer to the leaves from the upper part, that is to say, of the flowering part of the branches, and the width of the leaves is taken from their widest portions.

PEPEROMIA Ruiz & Pavon.

KEY TO THE PHILIPPINE SPECIES.

1. Leaves opposite.
   2. Limb of leaves glabrous, elliptic, up to 3.7 cm long and 1.7 cm wide. 1. *P. lagunaensis*
   2. Limb of leaves pubescent on both surfaces.
      3. Limb elliptic, up to 12.5 cm long, and 8 mm wide..... 2. *P. canlaonensis*
      3. Limb oblong- or obovate-elliptic, 17 mm long, 6 mm wide. 3. *P. Ventenatii β pubescens*
      3. Limb elliptic-lanceolate, 22 to 30 mm long, 12 to 17 mm wide. 4. *P. recurvata* forma *pilosior*
      3. Limb obovate, cuneate at the base, up to 25 mm long. 4. *P. recurvata* forma *longispica*

1. Leaves in whorls.
   2. Rachis glabrous.
      3. Limb glabrous, obovate-elliptic, 12 to 20 mm long, 8 to 10 mm wide. 5. *P. rubrivenosa*
      3. Limb pubescent, ovate-elliptic or subrhomboid, up to 25 mm long and 18 mm wide ..... 6. *P. tomentosa*
   2. Rachis pubescent; limb elliptic or rounded, 8 to 10 mm long, 6 to 8 mm wide, glabrous or more or less pubescent..... 7. *P. reflexa*

1. Leaves alternate.
   2. Limb of leaves quite glabrous.
      3. Stigma inserted a little below the top of the ovary.
         4. Limb ovate-rounded, up to 17 mm long and wide..... 8. *P. lanaoensis*

4. Limb elliptic-lanceolate, 3 to 5 cm long, 2 to 3 cm wide.... 9. *P. laevifolia*

3. Stigma inserted on top of the ovary.

4. Limb rounded-cordate or reniform, about 6 mm long and 8 mm wide. 10. *P. exigua*

4. Limb deltoid-cordate, about 25 mm long and 20 mm wide. 11. *P. pellucida*

4. Limb ovate, up to 40 mm long and 30 mm wide..... 12. *P. Merrillii*

4. Limb elliptic-lanceolate, 40 mm long, 20 mm wide; spike 1.5 mm thick. 13. *P. apoana*

4. Limb elliptic-lanceolate, 42 mm long, 22 mm wide; spike 1 mm thick. 14. *P. pellucidopunctulata*

2. Limb of leaves glabrous on both surfaces, ciliate on the margins, elliptic-lanceolate, up to 15 mm long and 13 mm wide..... 15. *P. negrosensis*

2. Limb of leaves glabrous on the upper surface, pubescent underneath, elliptic-lanceolate, 40 mm long, 29 mm wide..... 16. *P. Elmeri*

2. Limb of leaves pubescent on both surfaces.

3. Limb not black-dotted.

4. Limb obovate or elliptic, up to 23 mm long and 17 mm wide, not densely pilose ..... 17. *P. Macgregorii*

4. Limb obovate, up to 20 mm long and 12 mm wide, rather densely puberulous ..... 18. *P. rivulorum*

4. Limb elliptic-lanceolate, about 20 mm long and 12 mm wide, hairs very short ..... 19. *P. puberulifolia*

4. Limb elliptic-lanceolate, up to 25 mm long and 10 mm wide, hairs long. 20. *P. mindoroensis*

4. Limb elliptic, up to 26 mm long and 20 mm wide, hairs long. 21. *P. marivelesana*

3. Limb black-dotted underneath, subobovate-elliptic, hairs very short. 22. *P. pallidibacca*

1. **Peperomia lagunaensis** C. DC. sp. nov.

Foliis modice petiolatis, ellipticis, basi et apice acutis, utrinque glabris et junioribus margine ciliatis, dein omnino glabris, 3-nerviis, petiolis glabris; pedunculis axillaribus terminalibusque glabris, quam petioli duplo longioribus; spicis maturis folia paullo superantibus, subdensifloris; bracteae pelta orbiculari centro subsessili; antheris ellipticis, filamentis brevibus; ovario emerso obovato paullulo sub apice stigmatifero, stigmate parvo glabro, bacca globosa glandulis asperulata.

Herba epiphytica. Caulis inferne e nodis radicans et haud dense pilosus, superne ramulosus et glaber. Ramuli glabri in sicco complanati, in sicco usque ad 1.5 mm crassi. Folia opposita. Limbi in sicco membranacei, superis usque ad 37 mm longi et 17 mm lati. Petioli 5 mm, pedunculi 10 mm longi. Spicae usque ad 3 cm longae, 1 mm crassae. Bacca sessilis, sine pseudocupula, 0.5 mm crassa.

LUZON, Province of Laguna, Mount Maquiling, *Merrill 5130*, altitude about 1,100 m, March, not common; Mount Banajao, *Bur. Sci. 6079 Robinson*, March, *Bur. Sci. 2446 Foxworthy*, March: Province of Bataan, Mount Mariveles, *Whitford 114*, May, *Bur. Sci. 6210 Robinson*, August.

2. **Peperomia canlaonensis** C. DC. sp. nov.

Foliis sat longe petiolatis ellipticis basi subacutis apice obtusis, supra parce subtus densius et praesertim ad nervum pilosis, 1-nerviis nervuloque marginali fere usque ad tertiam partem longitudinis limbi ab apice decurrente, nervulis lateralibus paucis tenuissimis; petiolo piloso; pedunculis terminalibus pilosis petiolos pluries superantibus, spicis subdensifloris quam folia paullo longioribus, bracteae pelta rotunda centro brevissime pedicellata, antheris ellipticis; ovario emerso ovato superne in stilum cylindricum carnosum producto, stilo summo apice stigmatifero, stigmate penicillato; bacca subglobosa apice mucronulata, sine pseudocupula et glandulis subasperulata.

Herba ad terram vel arborum truncos inter muscos repens. Caulis filiformis pilosus. Folia opposita. Limbi in sicco membranacei et sparsim pellucido-punctati, usque ad 12.5 mm longi et 8 mm lati. Petioli 4 mm, pedunculi 12 mm longi. Bracteae pelta 0.5 mm diametro. Bacca sessilis, fere 1 mm longa et 0.75 mm crassa.

NEGROS, Canlaon Volcano, *Phil. Pl. 251 Merrill*, April, in the mossy forest, altitude 1,400 to 2,000 m.

3. **Peperomia Ventenatii** Miq. *β* **pubescens** Miq. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 486.

Foliis modice petiolatis, oblongo- vel obovato-ellipticis, basi acutis apice obtusis subacutisve, utrinque et subtus densius hirtellis, 1-nerviis nervuloque marginali ab apice decurrente; petiolis hirtellis; pedunculis terminalibus, hirtellis petiolos multo superantibus; spicis subdensifloris quam foliorum limbi subtriplo longioribus; bracteae pelta orbiculari centro breviter pedicellata, antheris rotundatis quam filamenta brevioribus; ovario emerso obovato-oblongo sub apice stigmatifero, stigmate minuto glabro, rhachi tarde sub bacca globosa producta.

Herba epiphyta, in truncis muscosis. Caulis subglaber inferne e nodis radicans, in sicco 1 mm crassus. Ramuli spiciferi dense hirtelli. Folia opposita. Limbi in sicco membranacei, 17 mm longi, 6 mm lati. Petioli 2 mm, pedunculi 11 mm longi. Spicae 35 mm longae, 1 mm crassae.

LUZON, District of Lepanto, Mount Data, *Merrill 4592*, November.
The type of the species is from Java.

4. **Peperomia recurvata** Miq. Syst. Pip. (1843) 141, **forma pilosior** C. DC.

Foliis breviter petiolatis, elliptico-lanceolatis, basi et apice acutis vel supremis obovatis basi acutis et summo apice acutis, utrinque dense hirtellis, 3-nerviis nervuloque marginali ex apice decurrente; pedunculis terminalibus axillaribusque petiolos superantibus dense hirtellis; spicis glabris glandulis conspersis folia fere triplo superantibus; bracteae pelta suborbiculari centro subsessili, antheris rotundato-ellipticis, ovario obovato paullo sub apice stigmatifero, stigmate minuto glabro.

Herba, caule dense hirtello e nodis radicante, in sicco 2 mm crasso. Folia opposita. Limbi in sicco membranacei creberrime pellucido-punctulati, 22-30 mm longi et 12-17 mm lati. Petioli 3 mm, pedunculi fere 5 mm longi. Spicae florentes circiter 32 mm longae et 0.75 mm crassae.

LUZON, Province of Benguet, Baguio, on mossy cliffs, *Elmer 6622*, June, *Bur. Sci. 3501 Mearns*, July.

The typical form of the species grows in Java.

Forma longispica C. DC. forma nov.

Foliis breviter petiolatis e basi cuneata obovatis apice rotundatis, utrinque petiolisque dense hirsutis, 3-nerviis; pedunculis axillaribus terminalibusque hirsutis quam petioli multo longioribus, spicis folia pluries superantibus, bracteae pelta rotundato-elliptica supra centrum pedicellata; antheris ellipticis, filamentis sat longis, ovario emerso ovato, sub apice stigmatifero, stigmate glabro, bacca globosa glandulis asperulata.

Herba rupicola, caule dense hirsuto inferne e nodis radicante, 2.5 mm crasso, superne ramuloso. Ramuli spiciferi hirsuti, 1.5 mm crassi in sicco, subteretes. Folia caulinia terna, ramulorum spiciferorum opposita. Limbi in sicco membranacei, usque ad 25 mm longi et 12 mm lati. Petioli 3 mm, pedunculi 10 mm longi. Spicae maturae usque ad 10.5 cm longae, in sicco 0.5 mm crassae.

LUZON, Province of Benguet, Kabayan, on wet rocky banks, *Merrill 4425*, October; Baguio, *For. Bur. 4847 Curran*, August, *Williams 1084*, June.

5. **Peperomia rubrivenosa** C. DC. sp. nov.

Foliis superis ternis, breviter petiolatis obovato-ellipticis, ima basi acutis subacutisve apice rotundatis, utrinque petiolisque glabris, inconspicue 3-nerviis, superis ternatis; pedunculis axillaribus terminalibusque petiolos pluries superantibus, densifloris; bracteae pelta orbiculari centro pedicellata; antheris ellipticis, filamentis brevibus; ovario rhachi impresso obovato, paullo sub apice stigmatifero, stigmate minuto glabro.

Herba epiphyta. Caulis in sicco complanatus 2 mm crassus, inferne radicans, pilosus, pilis fere 1.5 mm longis. Folia infera opposita. Limbi in sicco membranacei, pellucido-punctati, pallide virescentes, in vivo subtus rubrivenosi; limbi inferi utrinque pilosi, superi utrinque glabri, 12–20 mm longi, 8–17 mm lati. Petioli 2.5 mm, pedunculi 10 mm longi. Spicae florentes usque ad 4 cm longae et 1 mm crassae.

LUZON, Province of Benguet, Baguio, on trees, *Williams 1083*, May.

6. **Peperomia tomentosa** A. Dietr. Sp. Pl. 1 (1831) 172, **β carnosa** C. DC. Prodr. 16[1] (1869) 455.

LUZON, Province of Benguet, Baguio, *Dr. Pond*, March: Province of Abra, *Bur. Sci. 7226 Ramos*, February. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens' 517*, April, *s. n.*, July.

Java.

7. **Peperomia reflexa** A. Dietr. Sp. Pl. 1 (1831) 180.

Forma **subsessilifolia** C. DC. Prodr. 16[1] (1869) 452.

Luzon, Province of Benguet, Mount Tonglon (Santo Tomás), *For. Bur. 11105 Whitford*, April, *Bur. Sci. 5404 Ramos*, December, *Elmer 8576*, succulent herbs forming loose tufts upon moss-covered shrubs in dense woods; Mount Pulog, *For. Bur. 16239 Curran, Merritt & Zschokke*, January.

In the Hawaiian and other Pacific Islands.

Forma **capensis** Miq. Syst. Pip. (1843) 169.

Luzon, District of Lepanto, Mount Data, on mossy tree-trunks, *Merrill 4583*, November, *For. Bur. 16008 Bacani*, January: Province of Benguet, Mount Tonglon (Santo Tomás), on trees, *For. Bur. 5066 Curran*, August; Pauai, *Bur. Sci. 8461 McGregor*, June, altitude about 2,100 m. Mindanao, District of Davao, Mount Apo, *Copeland*, April.

South Africa.

Forma **parvilimba** C. DC. forma nov.

Limbis rotundato-ellipticis rotundisve, membranaceis, supra puberulis, subtus glabris, 6 mm longis.

Luzon, Province of Pampanga, Mount Arayat, on rocks near the summit, *Merrill 3918*, October, *Bolster 97*, May.

Forma **calcicola** C. DC. forma nov.

Limbis rotundis vel ovato-rotundis utrinque glabris, coriaceis, 8–9 mm longis.

Luzon, Province of Benguet, Baguio, plentiful on limestone formations, *Elmer 6077*, March, *Bur. Sci. 3480 Mearns*, July, *Williams 1114*, May.

8. **Peperomia lanaoensis** C. DC. sp. nov.

Omnino glabra, foliis sat longe petiolatis subovato-rotundis, 5-nerviis; pedunculis oppositifoliis terminalibusque petiolos aequantibus; spicis quam foliorum limbi subduplo longioribus, densifloris; bracteae pelta orbiculari centro pedicellata, filamentis antheras superantibus, ovario emerso obovato paullo sub apice stigmatifero.

Herba repens. Caulis tenuis, in sicco 0.55–0.75 mm crassus. Folia alterna. Limbi in sicco tenuiter membranacei, usque ad 17 mm longi latique. Petioli 8 mm longi. Spicae florentes 3 cm longae, 1 mm crassae.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 625*, June.

9. **Peperomia laevifolia** Miq. Syst. Pip. (1843) 107.

Luzon, Province of Bataan, Lamao River, Mount Mariveles, *Merrill 3205*, October, on wet mossy rocks, exposed ridges in the mossy forest, altitude about 1,200 m.

Java.

10. **Peperomia exigua** Miq. Syst. Pip. (1843) 77.

Mindanao, District of Davao, Mount Apo, *Elmer 11004*, June.

Java.

11. **Peperomia pellucida** Kunth in H. B. K. Nov. Gen. 1 (1815) 64.

LUZON, Manila, very common in damp places, *Elmer 5511*, January, *Merrill 87*, May, *Reyes 35*, September: Province of Pampanga, Bacolor, *Parker 23*, May.

The plant is used in various ways, either as a remedy or as a condiment and is now widely spread in all tropical countries.

12. **Peperomia Merrillii** C. DC. sp. nov.

Omnino glabra, foliis modice petiolatis, superis ovatis, basi obtusis superne breviter attenuatis et apice acutis obtusisve, 5-nerviis nervuloque marginali ab apice usque ad medium decurrente; pedunculis oppositifoliis quam petioli brevioribus, spicis adultis quam foliorum limbi paullo longioribus; bractea orbiculari centro pedicellata; filamentis adultis sat longis antheris rotundis quam filamenta brevioribus; ovario emerso ovato, summo apice stigmatifero, bacca globosa glandulis asperulata et sine pseudocupula.

Herba in rupibus repens, in vivo succulentissima. Caulis in sicco complanatus usque ad 3 mm crassus. Folia alterna. Limbi in sicco tenuiter membranacei usque ad 4 cm longi et 3 cm lati, limbi inferi rotundato-ovati basi et apice obtusi. Petioli 10–15 mm, pedunculi 5 mm longi. Spicae bacciferae usque ad 4.5 cm longae et 2 mm crassae. Bacca sessilis.

LUZON, Province of Cavite, Maragondong, in ravines along streams, altitude about 300 m, *Merrill 4180*, July: Province of Rizal, Bosoboso, *For. Bur. 3359 Ahern's collector*, September, *Bur. Sci. 1071 Ramos*, July; Montalban, *Loher 4585*, June.

13. **Peperomia apoana** C. DC. sp. nov.

Omnino glabra, foliis breviter petiolatis elliptico-lanceolatis basi cuneatis apice obtusiusculis, 3-nerviis; pedunculis terminalibus axillaribusque quam petioli paullo longioribus; spicis quam folia longioribus, bracteae pelta orbiculari centro subsessili, antheris ellipticis, ovario emerso obovato summo apice stigmatifero, stigmate minuto.

Herba epiphyta. Caulis 1.5 mm crassus, inferne e nodis radicans. Folia alterna. Limbi in sicco membranacei opaci, 4 cm longi, usque ad 2 cm lati. Petioli 3 mm longi. Spicae 4.5 cm longae, 1.5 mm crassae. Filamenta antheris breviora.

MINDANAO, District of Davao, Mount Apo, *Copeland 1002*, April.

14. **Peperomia pellucidopunctulata** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 756.

Omnino glabra, foliis modice petiolatis elliptico-lanceolatis basi et apice acutis, 5-nerviis; pedunculis terminalibus petiolos paullo superantibus; spicis folii limbum paullo superantibus subdensifloris; bractea orbiculari centro pedicellata, antheris parvis ellipticis; ovario emerso turbinato summo apice stigmatifero stigmate globoso, bacca subglobosa basi breviter attenuata.

Caulis inferne e nodis radicans, ramosus. Rami ut videtur erecti circiter 25 cm longi, in sicco 2.5 mm crassi. Folia alterna. Limbi in sicco membranacei creberrime pellucido-punctulati, superi usque ad 42 mm longi et 22 mm lati. Petioli 9 mm, pedunculi 12 mm longi. Spicae maturae 5 cm longae, 1 mm crassae. Rhachis sub bacca tarde in processum conicum producta. Bacca glandulis asperulata, fere 0.75 mm longa.

LUZON, Province of Albay, Mount Mayon, *Bur. Sci. 2962 Mearns*, June, *Bur. Sci. 6469 Robinson*, September; Province of Benguet, Baguio, *Elmer 8436*, March, a succulent herb on moist, deeply shaded cliffs and on moss-covered trees.

15. **Peperomia negrosensis** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 756.
NEGROS, Dumaguete, Cuernos Mountains, *Elmer 9425*, March.

16. **Peperomia Elmeri** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 757.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 10493*, May.

17. **Peperomia Macgregorii** C. DC. sp. nov.

Foliis breviter petiolatis, superis obovatis ellipticisve, basi acutis apice rotundatis, utrinque haud dense pilosis, 3-nerviis et creberrime nervulosis nervuloque marginali ab apice usque ad medium decurrente, petiolo haud dense piloso; pedunculis terminalibus haud dense pilosis quam petioli fere triplo longioribus, spicis florentibus quam foliorum limbi duplo longioribus, bracteae pelta rotunda centro breviter pedicellata, antheris ellipticis, ovario obovato paullo sub apice oblique stigmatifero, stigmate minuto glabro.

Herba repens. Caulis dense pilosus in sicco membranaceus, 1.5 mm crassus, pili fere 0.75 mm longi. Folia alterna. Limbi in sicco tenuissime membranacei, epunctulati, usque ad 23 mm longi et ad 17 mm lati. Petioli 2 mm longi. Spicae 4 cm longae, fere 1.5 mm crassae. Bracteae pelta 0.75 mm diametro.

LUZON, Province of Benguet, Pauai, altitude about 2,100 m, *Bur. Sci. 8380 McGregor*, June.

18. **Peperomia rivulorum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 758.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 11148*, July.

19. **Peperomia puberulifolia** C. DC. sp. nov.

Foliis breviter petiolatis elliptico-lanceolatis, basi acutis apice obtusiusculis utrinque puberulis, 3-nerviis, petiolo puberulo; pedunculis terminalibus glabris quam petioli pluries longioribus, spicis quam foliorum limbi longioribus, bracteae pelta rotunda centro subsessili, ovario emerso obovato paullulo sub apice oblique stigmatifero, stigmate glabro.

Herba repens. Caulis puberulus 1 mm crassus, pili brevissimi. Folia alterna. Limbi in sicco membranacei, superi fere 2 cm longi et 12 mm lati. Petioli 4 mm, pedunculi 15 mm longi. Spicae 2.5 cm longae, 0.5 mm crassae.

LUZON, Province of Laguna, Mabalucbaluc Pass, *Bur. Sci. 6047 Robinson*, March.

20. **Peperomia mindoroensis** C. DC. sp. nov.

Foliis modice petiolatis, alternis vel oppositis, elliptico-lanceolatis basi et apice acutis utrinque petiolisque sat longe pilosis, 3-nerviis, nervis lateralibus quam centralis multo tenuioribus; pedunculis axillaribus terminalibusque petiolos superantibus, spicis maturis quam folia paullo longioribus, bracteae pelta orbiculari centro subsessili; ovario rhachi impresso, obovato, paullo sub apice stigmatifero, stigmate minuto glabro, bacca globosa.

Herba arboricola. Caulis repens, in sicco 1 mm crassus, teres, ramulique dense et sat longe pilosi. Folia plerumque alterna, foliis oppositis intermixta. Limbi in sicco membranacei, usque ad 25 mm longi et 10 mm lati. Petioli 4 mm, pedunculi usque ad 8 mm longi. Spicae maturae usque ad 40 mm longae, 1 mm crassae. Rhachis sub bacca tarde producta. Bacca glandulis asperulata, sine pseudocupula.

MINDORO, Binabay River, on mossy trees, *Merrill 6107, 6184,* November.

21. **Peperomia marivelesana** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 758.

Foliis modice petiolatis, ellipticis basi acutis apice breviter et obtuse attenuatis utrinque appresse et sat longe pilosis, margine ciliatis, 3-nerviis; petiolo dense hirsuto; pedunculo petiolum fere aequante hirsuto; spicis quam foliorum limbi subtriplo longioribus, filiformibus, glandulis conspersis; bracteae pelta orbiculari centro pedicellata, glandulis conspersa; antheris rotundatis, ovario emerso obovato, sub apice stigmatifero, stigmate glabro.

Herba repens carnosa. Caulis ramulique dense hirsuti, ramuli in sicco 1 mm crassi. Folia alterna vel opposita. Limbi in sicco membranacei, pellucido-punctati, usque ad 26 mm longi et 20 mm lati. Petioli usque ad 8 mm longi. Spicae florentes 15 mm longae, 1 mm crassae. Bracteae pelta 1.25 mm diametro. Filamenta antheris breviora.

LUZON, Province of Bataan, Mount Mariveles, altitude about 1,100 m, on rocks and trees in moss, *Merrill 3721,* January, *Whitford 313,* May, altitude 280 m, *Elmer 6820,* November. PALAWAN, *Bur. Sci. 678 Foxworthy* (?), sterile specimen. MINDORO, Mount Halcon, *Merrill 6147,* November.

22. **Peperomia pallidibacca** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 759.

LUZON, Province of Benguet, Mount Tonglon (Santo Tomás), *Elmer 9344,* March.

PIPER Linn. p. p.

Sectio SARCOSTEMON C. DC. sect. nov.

Spicae solitariae, oppositifoliae. Flores dioici. Bractea hypopelta rhachi adnata, et tantum marginibus et extremitatibus libera. Stamen unicum, anthera in apice filamenti carnosi sita, bilocularis, rimis introrsis dehiscens; ovarium liberum. Bacca sessilis.

1. **Piper Korthalsii** Miq. in Ann. Mus. Bot. Ludg. Bat. 1 (1863) 139; C. DC. Prodr. 16[1] (1869) 365.

Luzon, Province of Benguet, *Elmer 5896*, masc., *5905*, fem., *8550*, masc., *8760*, fem., *Williams 1066*, fem., *Bur. Sci. 2503 Mearns*, fem.: Province of Tayabas, Lucban, *Elmer 9334*, fem., climbing slender trees up to 15 feet, there bushy and much branched, berries yellow, when fully mature red, altitude about 2,000 feet. Mindoro, Bongabong River, *Merrill 5592*, fem., *For. Bur. 3702 Merritt*. Negros, Cuernos Mountains, *Elmer 9598*, fem.

Sumatra.

β longibracteum C. DC. var. nov.

Bractea oblonga utrinque obtusa, 5 mm longa, 1.5 mm lata, filamento paullo longius puberulo, anthera fere in summo apice filamenti; fasciculis intramedullaribus 2-seriatis.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 463*, masc., along the river, April.

Sectio Eupiper C. DC. Prodr. 16[1] (1869) 339, emend.

Spicae solitariae, oppositifoliae. Flores dioici, raro hermaphroditi. Bractea hypopeltata, libera et pedicellata aut centro subsessilis, vel rhachi adnata et tantum marginibus et extremitatibus libera. Stamina 2 lateralia, rarius 3 vel 4 quorum 2 lateralia. Ovarium liberum vel in rhachi partim immersum et inferne cum ea concretum.

KEY TO THE PHILIPPINE SPECIES OF EUPIPER.

1. Berry not stipitate, free or partly imbedded in and concrescent with the rachis, or berry as yet unknown.
  2. Bract free, pedicellate or subsessile.
    3. Flowers dioecious.
      4. Limb of leaf multinerved, that is, with all the main nerves distinct or very nearly so from the base.
        5. Limb quite glabrous.
          6. Berry free.
            7. Limb cordate or repand at the base, 6 cm long, 1.5 cm wide. 2. *P. costulatum*
            7. Limb cordulate at the base, 12 to 15 cm long, 4.5 to 5 cm wide. 7. *P. miniatum* (formae)
            7. Limb acute at the base.
              8. Limb 4 cm long, 1.5 cm wide ..... 3. *P. curtifolium*
              8. Limb 8 cm long, 4 cm wide ..... 4. *P. varibracteum*
              8. Limb 11 cm long, 3.7 cm wide ..... 5. *P. cacuminum*
          6. Berry unknown; limb acute at the base, 5.5 cm long, 3.5 cm wide. 6. *P. fragile* var. *multinerve*
        5. Limb glabrous above, more or less pubescent on the lower surface.
          6. Berry free.
            7. Limb cordulate at the base, 12 to 15 cm long, 4.5 to 5 cm wide. 7. *P. miniatum*
            7. Limb tapering in its lower part and acute at the base, 9 cm long, 4 cm wide ..... 8. *P. halconense*
          6. Berry partly imbedded in and concrescent with the rachis.

7. Peduncle shorter than the petiole; limb ovate, rounded at the base, 5.5 cm long, 4 cm wide..... 9. *P. mindorense*
7. Peduncle longer than the petiole; limb oblong-ovate, cordate at the base, up to 6.5 cm long and 3.7 cm wide..... 10. *P. longum*

5. Limb pubescent on both surfaces.
6. Berry free and without a style; limb ovate-oblong, obtuse at the base, 14.5 cm long, 5.2 cm wide..... 11. *P. pilipes*
6. Berry free and with a terminal style; limb ovate-oblong, cordate at the base, 13 to 19 cm long, up to 9 cm wide.... 12. *P. rhyncholepsis*

4. Limb multiplinerved or penninerved, that is, with some of the lateral nerves or all of them issuing from the central nerve.
5. Limb cordate at the base.
6. Limb entirely glabrous.
7. Limb multiplinerved.
8. Berry free.
9. Peduncle shorter than the petiole; limb 20 cm long, 9.5 cm wide ..... 13. *P. lageniovarium*
9. Peduncle as long as the petiole; limb 7 cm long, 5.5 cm wide. 14. *P. sarmentosum*
9. Peduncle longer than the petiole.
10. Limb 12 cm long, 6.5 cm wide..... 15. *P. Zamboangae*
10. Limb 23 to 26 cm long, 13 to 16 cm wide.... 16. *P. Forstenii*
8. Berry partly imbedded in and concrescent with the rachis.
9. Limb 11 cm long, 4.5 cm wide; spike 3 cm long. 49. *P. retrofractum* β
9. Limb 17.5 cm long, 10.5 cm wide; spike 32 cm long. 17. *P. rotundistigmum*
8. Berry unknown; peduncle shorter than the petiole; limb 11.5 cm long, 9 cm wide..... 18. *P. Fenixii*
7. Limb penninnerved; berry free; limb 12 to 15 cm long, 9 to 10 cm wide; connective prolonged above the pollen-sacs. 48. *P. corylistachyon* forma *a*
6. Limb glabrous above, more or less pubescent on the lower surface, at least on the nerves.
7. Limb up to 14.5 cm long and 7 cm wide; female spike 2.5 cm long. 19. *P. aurilimbum*
7. Limb up to 21 cm long and 12 cm wide; male spike 11 cm long. 20. *P. subprostratum*
6. Limb pubescent on both surfaces.
7. Limb ovate-oblong, long-acuminate, 10 cm long, 2.8 cm wide. 21. *P. Ramosii*
7. Limb subovate-elliptic, shortly acuminate, 19 cm long, 9.5 cm wide. 22. *P. Merrillii*

5. Limb semicordate at the base, up to 21 cm long and 8 cm wide; male and female spikes 3 to 4 cm long..... 23. *P. pseudochavica*

5. Limb neither cordate nor semicordate at the base.
6. Limb quite glabrous.
7. Limb multiplinerved.
8. Berry free.
9. Limb narrowly ovate-lanceolate, up to 8 cm long and 2.5 cm wide ..... 59. *P. delicatum* β
9. Limb elliptic, 16 cm long, 11.5 cm wide..... 24. *P. cristatum*

9. Limb elliptic-lanceolate, up to 17 cm long and 4.7 cm wide. 25. *P. longistigmum*
9. Limb widely subovate-elliptic, up to 5 cm long and 13 cm wide. 26. *P. albidirameum*

8. Berry partly imbedded in and concrescent with the rachis.
9. Limb not attenuate above the extreme base.
10. Rachis glabrous.
11. Peduncle shorter than the petiole.
12. Limb rounded-elliptic, up to 21 cm long and 15 cm wide ..... 27. *P. maagnasanum*
12. Limb widely ovate, up to 22.5 cm long and 14 cm wide. 28. *P. pendulifolium*
11. Peduncle longer than the petiole; limb ovate, up to 11.5 cm long and 6 cm wide..... 29. *P. puberulinodum*
10. Rachis pilose.
11. Peduncle shorter than the petiole; limb ovate, rounded or obtuse at the base, 9.5 to 12 cm long, 7.5 to 9.5 cm wide ..... 30. *P. oophyllum*
11. Peduncle nearly equal to the petiole; limb ovate, cordulate at the extreme base, 14.5 cm long, 9 cm wide. 31. *P. petraeum*
11. Peduncle longer than the petiole; limb ovate, rounded at the base, 10 to 13 cm long, 6.5 to 7.5 cm wide. 32. *P. Betle*

9. Limb distinctly attenuate from above the base.
10. Rachis glabrous.
11. Limb equilateral at the base.
12. Peduncle nearly equal to the petiole; limb ovate, up to 9 cm long, and 6.5 cm wide.... 33. *P. carnistilum*
12. Peduncle longer than the petiole.
13. Limb ovate-lanceolate, 8 to 11 cm long, 3 to 4 cm wide ..... 34. *P. Chaba*
13. Limb rhomboid-lanceolate, 10 cm long, 3.2 cm wide. 35. *P. rhombophyllum*
11. Limb distinctly inequilateral at the base; elliptic-lanceolate, 6 to 7 cm long, 2.5 to 4 cm wide. 36. *P. Langlassei*
10. Rachis pilose.
11. Peduncle equaling or a little shorter than the petiole.
12. Limb elliptic-lanceolate, 12 cm long, 6 cm wide. 37. *P. breviamentum*
12. Limb ovate, up to 9 cm long and 4 cm wide. 38. *P. baguionum*
11. Peduncle longer than the petiole; limb ovate-lanceolate, up to 11 cm long and 5.5 cm wide.. 39. *P. bathycarpum*

8. Berry unknown.
9. Limb equilateral or nearly so at the base.
10. Peduncle shorter than or nearly equal to the petiole.
11. Limb elliptic-lanceolate, 8.5 cm long, 3.5 cm wide. 40. *P. cagayanense*
11. Limb oblong-ovate, up to 11 cm long and 5.5 cm wide. 41. *P. firmolimbum*

11. Limb oblong-elliptic-lanceolate, up to 12.5 cm long and 4.5 cm wide ..... 42. *P. malindangense*
11. Limb narrowly subovate-lanceolate, up to 9 cm long and 1 cm wide ..... 43. *P. podandrum*

10. Peduncle longer than the petiole.
11. Limb narrowly ovate-lanceolate, up to 10 cm long and 1.5 cm wide ..... 44. *P. viminale*
11. Limb ovate-elliptic, up to 14 cm long and 6.5 cm wide. 45. *P. philippinum*
11. Limb elliptic-oblong, 15 cm long, 5 cm wide. 46. *P. Jagori*

9. Limb distinctly inequilateral at the base; peduncle longer than the petiole; limb ovate, 6.3 cm long, 3.2 cm wide. 47. *P. polycladum*

7. Limb penninerved.
8. Berry free; limb oblong-ovate, 15 to 17 cm long, 6.5 to 7.5 cm wide; connective distinctly prolonged above the pollen-sacks. 48. *P. corylistachyon*
8. Berry partly imbedded in and concrescent with the rachis; limb oblong-elliptic or ovate-elliptic, 8.5 to 16 cm long, 3.5 to 6.5 cm wide ..... 49. *P. retrofractum*
8. Berry unknown.
9. Limb equilateral at the base, elliptic-lanceolate, up to 20 cm long and 8.5 cm wide..... 50. *P. penninerve*
9. Limb distinctly inequilateral at the base, ovate-lanceolate, up to 8.5 cm long and 3.5 cm wide..... 51. *P. striatum*

6. Limb glabrous above, more or less pubescent on the lower surface.
7. Limb multiplinerved.
8. Limb not attenuate above the extreme base.
9. Berry free; limb elliptic-lanceolate, up to 16 cm long and 5 cm wide ..... 52. *P. oblongibaccum*
9. Berry partly imbedded in and concrescent with the rachis; limb rounded-ovate, up to 13 cm long and 9 cm wide. 53. *P. Williamsii*

9. Berry unknown.
10. Bract orbicular.
11. Limb ovate-elliptic, 6 cm long, 2.6 cm wide. 54. *P. Allenii*
11. Limb rounded-ovate, 10 to 11 cm long, 7 to 8 cm wide. 55. *P. sibulanum*
11. Limb oblong-ovate, 11 cm long, 5 cm wide. 56. *P. malarayatense*

10. Bract elliptic or semilunar.
11. Spike much shorter than the limb, the limb ovate, up to 7.2 cm long and 3 cm wide..... 57. *P. siassiense*
11. Spike about twice as long as the limb, the limb oblong-ovate, 7 cm long and 3 cm wide..... 58. *P. laxirameum*

8. Limb attenuate above and acute at the base.
9. Berry free.
10. Limb narrowly ovate-lanceolate, up to 8 cm long and 2.5 cm wide ..... 59. *P. delicatum*
10. Limb elliptic-lanceolate, up to 18 cm long and 7 cm wide. 60. *P. denudatum*

9. Berry partly imbedded in and concrescent with the rachis; limb elliptic-lanceolate, up to 14 cm long and 6 cm wide. 61. *P. longivaginans*

7. Limb penninerved.

8. Berry free; limb elliptic-oblong, inequilateral and attenuate at the base, up to 19 cm long and 6 cm wide.. 62. *P. parcirameum*

8. Berry partly imbedded in and concrescent with the rachis; limb elliptic-lanceolate, rounded on one side of the base, up to 13 cm long and 5.5 cm wide..... 63. *P. crassinodum*

6. Limb pubescent on both surfaces.

7. Branchlets glabrous; berry unknown; limb ovate-oblong, up to 11.7 cm long and 3.4 cm wide..... 64. *P. parcipilum*

7. Branchlets pubescent.

8. Berry free; bract orbicular.

9. Limb elliptic-lanceolate, up to 5.5 cm long and 2 cm wide. 65. *P. Robinsonii*

9. Limb ovate- or elliptic-lanceolate, 9.5 to 10.5 cm long, 3.5 to 4.5 cm wide ..... 66. *P. ovatibaccum*

9. Limb ovate-lanceolate, up to 13 cm long and 4 cm wide. 67. *P. Toppingii*

8. Berry unknown; bract obovate; limb ovate-lanceolate, up to 9 cm long and 2.5 cm wide..... 68. *P. obovatibracteum*

3. Flowers hermaphrodite.

4. Ovary free; limb ovate, acute at the equilateral base, rather long-acuminate, 8.5 cm long, 4.7 cm wide..... 69. *P. Mearnsii*

4. Ovary partly imbedded in and concrescent with the rachis; limb elliptic-lanceolate, acute at the equilateral base, long-acuminate, up to 12 cm long and 5.5 cm wide..... 70. *P. Copelandii*

2. Bract oblong or obovate-oblong, adnate to the rachis, free only along its margins and at its extremity; berry free, not stipitate.

3. Flowers dioecious.

4. Limb of leaf multinerved, quite glabrous.

5. Limb 5-nerved, rachis pubescent.

6. Limb elliptic-lanceolate, 7 to 10 cm long, 4 to 6 cm wide. 71. *P. interruptum*

6. Limb narrowly ovate-lanceolate, 11.5 cm long, 2.5 cm wide. 72. *P. ellipticibaccum*

5. Limb 7-nerved.

6. Limb rounded at the base, subrounded-ovate in outline, acuminate at the apex, 11 cm long and 6.5 cm wide; rachis glabrous. 73. *P. Clemensiae*

6. Limb acute or subacute at the base; rachis pubescent.

7. Scandent.

8. Limb ovate-lanceolate, up to 12 cm long and 6.5 cm wide. 74. *P. Loheri*

8. Limb ovate-elliptic, 16 cm long, 8.5 cm wide. 75. *P. laevirameum*

7. Not scandent; limb ovate-lanceolate, 10.5 cm long, 5.5 cm wide. 76. *P. abraense*

4. Limb multiplinerved, quite glabrous.

5. Rachis glabrous.

6. Limb ovate-elliptic, acute and slightly longer on one side at the base, of the same width on both sides of the central nerve, 11 to 15 cm long, 5 to 9 cm wide..... 77. *P. glabrispicum*
6. Limb ovate-elliptic, subacute and of the same length on both sides at the base, distinctly not of the same width on both sides of the central nerve, 11 to 15 cm long, 5 to 9 cm wide..... 78. *P. nigrum*

5. Rachis pilose.
6. Limb oblong-ovate, obtuse at the base, 12.5 cm long, 4.7 cm wide; spike shorter than the limb..... 79. *P. pilispicum*
6. Limb ovate, acute at the base, 9 cm long, 4.7 cm wide; spike several times longer than the limb..... 80. *P. davaoense*

3. Flowers hermaphrodite; limb elliptic, acute at the base, 11 cm long, 5 cm wide ..... 78. *P. nigrum β trioicum*

1. Berry free and stipitate.
2. Limb of leaf multinerved and quite glabrous, ovate-elliptic, subacute at the base, rather long-acuminate at the apex, up to 8.5 cm long, 4.5 cm wide. 81. *P. pulogense*

2. Limb multiplinerved.
3. Limb quite glabrous or very sparingly hirtellous on the central nerve beneath.
4. Bract orbicular and glabrous.
5. Limb oblong-ovate, obtuse or cordulate at the base, up to 10 cm long, and 3.2 cm wide ..... 82. *P. apoanum*
5. Limb narrowly oblong-ovate, obtuse and slightly inequilateral at the base, 11 cm long, 1.8 cm wide..... 83. *P. negrosense*
5. Limb oblong, equilateral and obtuse or acute at the base, 11 cm long, 3.5 to 4 cm wide..... 84. *P. densibaccum*
5. Limb elliptic-lanceolate, attenuate in its lower portion, equilateral and acute at the base, up to 12 cm long and 3.5 cm wide. 85. *P. dipterocarpinum*
4. Bract rounded-obovate, glabrous; limb ovate or oblong-ovate, rounded or subrounded at the slightly inequilateral base, 11.5 cm long, 5 to 7.5 cm wide ..... 86. *P. dagatpanum*
4. Bract transversely elliptic, glabrous; limb elliptic-lanceolate, attenuate in its lower portion and acute at its equilateral base, 9 to 10 cm long, 3 to 3.5 cm wide..... 87. *P. paucinerve*
4. Bract orbicular and ciliate on the margin; limb ovate-oblong, cordate at the base, up to 12 cm long and 4 cm wide..... 88. *P. tenuirameum*

3. Limb glabrous or sparingly hirtellous on the central nerve of the upper surface, more or less pubescent on the lower surface.
4. Berry globose or subglobose.
5. Bract orbicular, glabrous.
6. Limb oblong-ovate, cordulate or obtuse at the base, up to 11.5 cm long and 4.5 cm wide..... 89. *P. marivelesanum*
6. Limb ovate, rounded at the base, attenuate at the apex, up to 10.5 cm long and 5.2 cm wide..... 90. *P. basilanum*
6. Limb ovate, rounded at the base, long-acuminate at the apex, 12 cm long, 7 cm wide..... 92. *P. caninum* var. *sablanum*
6. Limb elliptic-lanceolate, acute at the base, 13.5 cm long, 6 cm wide. 91. *P. Hallieri*
5. Bract obovate-rounded, glabrous; limb ovate-lanceolate, acute at the base, up to 11.5 cm long and 5.5 cm wide. 92. *P. caninum* var. *glabribracteum*

5. Bract orbicular, ciliate on the margins; limb ovate-oblong, acute at the base, up to 11 cm long and 4 cm wide..... 92. *P. caninum*

4. Berry fusiform; limb narrowly elliptic-lanceolate, 10.5 cm long, 3 cm wide. 93. *P. acutibaccum*

3. Limb pubescent on both surfaces.

4. Bract orbicular and glabrous.

5. Limb ovate-acuminate, equilateral and rounded at the base, 8.5 cm long, 5 cm wide ..... 92. *P. caninum* var. *latibracteum*

5. Limb ovate-acuminate, cordate and slightly inequilateral at the base, 10.5 cm long, 4.7 cm wide..... 94. *P. Merrittii*

4. Bract obovate, glabrous; limb ovate, equilateral and cordate at the base, 12 cm long, 6 cm wide..... 95. *P. tenuipedunculatum*

2. Limb penninerved.

3. Limb glabrous on the upper surface, pubescent beneath, oblong-ovate, acute and nearly equilateral at the base, up to 12 cm long and 5.2 cm wide. 96. *P. malalaganum*

3. Limb pubescent on both surfaces, ovate-elliptic, rounded on one side, acute on the other side of the inequilateral base, up to 14 cm long and 4.5 cm wide ..... 97. *P. villilimbum*

2. **Piper costulatum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 760.

Foliis breviter petiolatis ovato-lanceolatis basi aequilatera cordatis vel repandis apice acute et sat longe acuminatis utrinque glabris, 7-9-nerviis, nervis lateralibus extremis 2 vel 3 quam alii tenuioribus et magis divaricantibus; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro quam petiolus multo breviore, spica subflorente quam folii limbus quadruplo breviore, rhachi hirtella, bracteae glabrae pelta orbiculari paullo infra centrum pedicellata, staminibus 2 antheris ovatis parvis; stirpis fem. pedunculo ut in mare, spica quam folii limbus fere triplo breviore, cylindrica apice obtusa, rhachi hirtella, bracteae glabrae pelta orbiculari centro subsessili, bacca libera globosa, stigmatibus 3 oblongis et acutis.

Dioicum, in arboribus scandens. Ramuli glabri primum costulati dein teretes, spiciferi 1 mm crassi, collenchyma in fasciculos discretos in costulis dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes nulli; cellulae selerosae interfasciculares cum phloemate fasciculorum periphericorum continuae. Limbi in sicco tenuiter membranacei pellucidi et minute pellucido-punctulati, in mare usque ad 6 cm longi et 1.5 cm lati, in femina paullo breviores. Petioli circiter 7 mm, pedunculi 3 mm longi. Stirpis masc. spicae florentes 1.25 mm, stirpis fem. 7 mm crassae, baccae dense confertae 2 mm crassae. Stigmata in apice baccae sessilia.

Luzon, Province of Bataan, Mount Mariveles, *Merrill 3768*, masc., *3248* fem., common on ridges in the mossy forest, on small trees, altitude 700 m, *Whitford 129*, masc., altitude about 1,000 m, *For. Bur. 2411 Meyer*, masc., altitude about 1,100 m, *Williams 415*, masc., *743*, fem., *For. Bur. 6221*, *6222* masc., *6271* fem., *Curran*, altitude 800 m, *For. Bur. 209 Barnes*, masc., *For. Bur. 2394*, masc., *2097*, fem. *Borden*, altitude about 1,000 m, *Copeland 258*, masc., altitude about 1,000 m, *Elmer 6805*, fem., *Bur. Sci. 1597 Foxworthy*, fem.

3. Piper curtifolium C. DC. sp. nov.

Omnino glabrum, foliis parvis modice petiolatis ovato-lanceolatis, inferne attenuatis et ima basi aequilatera acutis apice acute acuminatis, 5-nerviis; petiolo ima basi vaginante; stirpis fem. pedunculo petiolum aequante, spica matura quam folii limbus fere quadruplo breviore cylindrica apice obtusa, bracteae pelta longitudinaliter elliptica centro breviter pedicellata, ovario libero ovato, stigmatibus 3 vel 4 ovato-acutis, bacca globosa.

Dioicum, scandens. Ramuli glabri, primum laeves et postea crebre lenticellosi, spiciferi 1 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes nulli. Limbi in sicco membranacei creberrime pellucido-punctulati usque ad 4 cm longi et 1.5 cm lati. Petioli 5 mm longi. Bracteae pelta 1.5 mm longa 1 mm lata. Bacca 1.5 mm crassa. Stigmata in apice ovarii sessilia.

LUZON, Province of Abra, Mount Paraga, *Bur. Sci. 7107 Ramos*, February.

4. Piper varibracteum C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 760.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 11998*, October.

5. Piper cacuminum C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 761.

Foliis modice petiolatis ovato-oblongis basi ima aequilatera acutis apice longe attenuato-acuminatis, utrinque glabris, 5-nerviis; petiolo glabro ultra medium vaginante; stirpis fem. pedunculo glabro petiolum paullo superante; spica quam folii limbus pluries breviore, ovata, rhachi hirsuta, bracteae glabrae pelta rotunda centro pedicellata, ovario libero, stigmatibus 3 rotundis, baccis condensis ovatis apice acutis.

Dioicum, scandens. Ramuli glabri in sicco rubro-fusci, spiciferi 1-2 mm crassi, costulati, collenchyma in fasciculos discretos in costulis dispositum et haud libriforme, canalis lysigenis nullus. Limbi in sicco membranacei minute pellucido-punctulati, 11 cm longi et usque ad 3.7 cm lati. Petioli 1 cm, pedunculi 1.5 cm longi. Spica matura 15 mm longa, 9 mm crassa, flores in vivo albi. Baccae in vivo atro-rubrae in sicco fuscescentes, bracteae pelta 1 mm diametro. Stigmata in apice ovarii sessilia.

LUZON, Province of Bataan, Mount Mariveles, *Elmer 6890*, November, rare near the summit of the mountain: Province of Zambales, Mount Tapulao, *For. Bur. 8076 Curran & Merritt*, above an altitude of 2,000 m.

6. Piper fragile Benth. in Hook. Lond. Journ. Bot. 2 (1843) 234, var. **multinerve** C. DC. var. nov.

Foliis longe petiolatis elliptico-lanceolatis basi ima aequilatera acutis apice breviter attenuato-acutis, utrinque glabris, 5-nerviis; petiolo basi ima vaginante; stirpis masc. pedunculo quam petiolus paullo longiore, glabro; spica florente quam folii limbus dimidio breviore, rhachi hirsuta, bracteae glabrae pelta orbiculari pedicello longiusculo hirsuto, antheris ellipticis filamentis brevissimis.

Dioicum, scandens. Ramuli glabri, spiciferi 1 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei minute pellucido-punctulati, 5.5–6 cm longi, 3.5 cm lati, inferi rotundati et 5 mm supra basin peltati apice acuminati. Petioli 15 mm, pedunculi 10 mm longi. Spica florens circiter 25 mm longa, 1 mm crassa. Stamina 2, antherae bivalvae.

Luzon, Province of Camarines, Pasacao, near seashore, *Merrill 2366*. Bucas, *Merrill 5271*.

The species grows in New Guinea.

7. **Piper miniatum** Bl. in Verh. Bat. Genoots. 11 (1826) 166.

Luzon, Province of Albay, *Cuming 841:* Province of Bataan, Mount Mariveles, *Whitford 504, Leiberg 6077, Elmer 6683*. Samar, *Cuming 1708*. Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens, s. n.*

Forma **b** C. DC.

Foliis ramulisque omnino glabris, ramulis in sicco flavidis, limbus quoad latitudinem ut in typo.

Luzon, Province of Abra, Mount Paraga, *Bur. Sci. 7205 Ramos*.

Forma **c** C. DC.

Foliis ramulisque omnino glabris limbis coriaceis quam in typo multo angustioribus, ramulis fuscescentibus.

Luzon, Province of Tayabas, Lucban, in forests, altitude 800 m, *Elmer 7384, 7910*.

Widely distributed in India and the Malay Peninsula and Archipelago.

β **hirtellum** C. DC. Prodr. **16**[1] (1869) 355.
Chavica miniata β hirtella Miq. Sumatra (1862) 473.

Ramulis novellis petiolisque rufo-hirsutis, foliis subtus ad nervos pilosis.

Mindanao, District of Davao, Todaya (Mount Apo), in damp forests on steep slopes at an altitude of about 750 m, *Elmer 11229*.

8. **Piper halconense** C. DC. sp. nov.

Foliis modice petiolatis ovato-lanceolatis, inferne attenuatis et basi ima aequilatera acutis, apice acute attenuato-acuminatis, supra glabris subtus ad nervos parce hirtellis, 7-nerviis nervis lateralibus extremis quam alii multo tenuioribus; petiolo glabro fere usque ad limbum vaginante; stirpis fem. pedunculo glabro petiolum aequante, spica matura quam folii limbus pluries breviore, cylindrica, rhachi hirsuta, bractea sessili rotunda glabra, bacca libera ovata apice in stilum brevem attenuata, stigmatibus 3 minutis ovato-acutis.

Dioicum, erectum, 1 m altum. Ramuli glabri teretes, spiciferi 1 mm crassi, collenchyma continuum haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis nullus. Limbi in sicco membranacei creber-

rime pellucido-punctulati, 9 cm longi 4 cm lati. Petioli pedunculique 10–11 mm longi. Spica 8–15 mm longa 5–6 mm crassa, in vivo aureo-flava. Bractea 0.75 mm diametro. Bacca cum stilo 2 mm longa, in vivo rubra in sicco fuscescens.

MINDORO, Mount Halcon, *For. Bur. 4393 Merritt*, in flower, June, *Merrill 5773*, in fruit, November.

9. **Piper mindorense** C. DC. sp. nov.

Foliis parvis breviter petiolatis, ovatis basi aequilatera rotundatis apice breviter et subacute acuminatis, supra glabris subtus ad nervos hirtellis, 9-nerviis nervis lateralibus extremis tenuibus; petiolo dense hirtello fere usque ad limbum vaginante; stirpis fem. pedunculo hirtello quam petiolus breviore, spica matura subglobosa, bracteae pelta rotunda, bacca inferne rhachi immersa superne umbonata, stigmatibus 3 linearibus.

Dioicum, scandens. Ramuli dense retrorsum et crispule hirtelli, spiciferi 2 mm crassi, collenchyma continuum haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco rigiduli, usque ad 5.5 cm longi et 3.5 cm lati. Petioli 10 mm, pedunculi 6 mm longi. Spica matura circiter 7 mm longa. Stigmata in apice baccae sessilia.

MINDORO, Mount Halcon, *For. Bur. 4474 Merritt*, June.

10. **Piper longum** Linn. Sp. Pl. (1753) 41, excl. syn. Rumph.
PHILIPPINES, unknown collector in herb. DC.

11. **Piper pilipes** C. DC. sp. nov.

Foliis brevissime petiolatis, ovato-oblongis basi aequilatera obtusis apice acute acuminatis, utrinque et praesertim subtus villosis, 5-nerviis, petiolo dense villoso basi ima vaginante; stirpis fem. pedunculo dense villoso petiolum pluries superante, spica matura folii limbum aequante, rhachi hirsuta, bracteae pelta rotunda glabra, centro pedicellata pedicello sat longo hirsuto, bacca libera oblonga apice rotundata, stigmatibus 3 minutissimis et cito deciduis.

Dioicum, scandens. Ramuli villosi, pili in sicco rufescentes 1.5 mm longi, ramuli spiciferi 1.5 mm crassi, collenchyma subcontinuum et libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei pellucido-punctulati, usque ad 14.5 cm longi et ad 52 mm lati. Petioli 6 mm, pedunculi 30 mm longi. Spica cum baccis circiter 6 mm crassa. Bracteae pelta 0.75 mm diametro. Bacca 1.5 mm longa, 0.75 mm crassa. Stigmata in apice baccae sessilia.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July. POLILLO, *Bur. Sci. 6914 Robinson*, August, 1909, on river banks, east of the town of Polillo, climbing on trees, flowers dark-red.

12. **Piper Rhyncholepsis** C. DC. Prodr. 16[1] (1869) 344.
Rhyncholepsis Cumingiana Miq. Syst. Pip. (1843) 282.
SAMAR, *Cuming 1697*.

Var. **brevicuspe** C. DC. l. c.
Rhyncholepsis brevicuspis Miq. l. c.
Bohol, *Cuming 1843.*

13. **Piper lageniovarium** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 763.
Mindanao, District of Davao, Todaya (Mount Apo), *Elmer 10589*, May.

14. **Piper sarmentosum** Roxb. Fl. Ind. ed. Carey & Wall. 1 (1820) 162.
Luzon, Province of Albay, Batan Island, *Bur. Sci. 6429 Robinson*, September.

15. **Piper Zamboangae** C. DC. sp. nov.

Omnino glabrum, foliis modice petiolatis, ovatis, basi leviter cordatis apice acute acuminatis, 7-plinerviis; nervo centrali nervos 2 adscendentes subopposite mittente, quorum supremus a 1 cm supra basin solutus, nervis lateralibus 2 utrinque a basi solutis, petiolo basi ima vaginante; stirpis fem. pedunculo petiolum duplo superante, spica subflorente cylindrica quam folii limbus pluries breviore, bracteae pelta rotunda, ovario libero, stigmatibus 3 ovatis.

Dioicum. Ramuli glabri, spiciferi 1 mm crassi, collenchyma continuum interrupte incrassatum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes peripherici nulli. Limbi in sicco membranacei, pellucido-punctulati, superi 12 cm longi et 6.5 cm lati, inferi ovato-rotundi basi profunde cordati, 12 cm longi et 10 cm lati. Petioli 1 cm, pedunculi 2 cm longi. Spica subflorens 1 cm longa, 2 mm crassa. Bracteae pelta 0.75 mm diametro.

Mindanao, District of Zamboanga, *Hallier*, February.

16. **Piper Forstenii** C. DC. Prodr. 16[1] (1869) 348, emend.

Foliis modice petiolatis, ample ovatis basi valde inaequilatera cordatis apice subacute attenuato-acuminatis, utrinque glabris, 13-15-plinerviis nervo centrali fere ex 0.25 longitudinis suae nervum adscendentem utrinque alternatim mittente, aliis nervis altero latere 5 vel 6 altero 7 vel 8 a basi divaricantibus; petiolo glabro fere usque ad medium vaginante; stirpis fem. pedunculo glabro petiolum superante, spica matura quam folii limbus longiore, crassa, rhachi hirsuta; bracteae pelta rotunda glabra, pedicello longo hirsuto, ovario libero ovato apice attenuato, stigmate carnoso trilobulato, baccis condensis oblongo-ovatis.

Dioicum, scandens. Ramuli glabri in sicco pallidi, spiciferi 6 mm crassi, collenchyma continuum haud libriforme, fasciculi intramedullares 2-seriati, canalis lysigenis centralis canalesque peripherici numerosi cellulis gelifactis farcti. Limbi in sicco pergamacei pallescentes, a petiolo 23–26 cm longi, 13–16 cm lati, lobi basilares inaequales summo petiolo inserti. Stipulæ superne ad petiolum attenuatae. Petioli 4 cm, pedunculi 57 mm longi. Spica matura 29 cm longa inferne circiter 1 cm crassa. Bracteae pelta 1 mm diametro. Bacca 1.5 mm longa.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 572*, May, in flower, *s. n.*, July, in fruit: District of Davao, Todaya (Mount Apo) *Elmer 11179*, July, in fruit.

Also found in Amboina.

17. **Piper rotundistigmum** C. DC. sp. nov.

Foliis modice petiolatis, ovatis basi aequilatera cordatis apice acute acuminatis, supra glabris subtus ad nervos parcissime pilosis, 17-plinerviis nervo centrali usque ad tertiam partem longitudinis suae nervos adscendentes utrinque 3 mittente aliis nervis a basi divaricantibus; petiolo dense piloso basi fere imâ vaginante; stirpis fem. pedunculo petiolum superante glabro, spica matura folii limbum multo superante cylindrica crassa apice attenuata, rhachi glabra, bracteae glabrae pelta lunulata pedicello brevi carnoso, bacca inferne in rhachi immersa; stigmatibus 3, rotundatis brevibus carnosis.

Dioicum. Ramuli glabri, spiciferi 4 mm, in 5 mm crassis collenchyma libriforme in fasciculos discretos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco firmo-membranacei inconspicue pellucido-punctulati, 17.5 cm longi 10.5 cm lati. Petioli usque ad 2.5 cm longi et 2 mm crassi. Pedunculi 4 cm longi et 2 mm crassi. Spica 32 cm longa et usque ad 7 mm crassa. Bracteae pelta 0.75 mm longa et 1 mm lata. Stigmata in apice baccae sessilia.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September.

18. **Piper Fenixii** C. DC. sp. nov.

Foliis sat longe petiolatis, rotundato-ovatis basi aequilatera cordatis apice acute protracto-acuminatis, utrinque glabris, 9-ninerviis nervo centrali ex 7–12 mm supra basin nervum adscendentem utrinque vel tantum altero latere mittente, aliis nervis a basi divaricantibus; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro quam petiolus multo breviore, spica florente quam folii limbus paullo breviore, rhachi parce pilosa, bracteae glabrae pelta rotunda centro pedicellata, staminibus 2, antheris minutis rotundatis, quam filamenta brevioribus.

Dioicum, scandens. Ramuli glabri, vetustiores in sicco albicantes, spiciferi fuscescentes fere 2 mm crassi, collenchyma continuum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco rigido-membranacei creberrime pellucido-punctulati, usque ad 11.5 cm longi et 9 cm lati. Petioli 20 mm, pedunculi 9 mm longi. Spica 8.5 cm longa, 2 mm crassa. Bracteae pelta 0.75 mm diametro, antherae bivalvatae.

BATANES ISLANDS, Batan, *Bur. Sci. 3652 Fénix*, rocky hillsides along streams, May.

19. **Piper aurilimbum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 764.

LUZON, Province of Benguet, near Sablan, *Elmer 8866*, March.

20. **Piper subprostratum** C. DC. sp. nov.

Foliis modice petiolatis, oblongo-ovatis basi valde inaequilatera cordatis apice attenuato-acutis, supra glabris subtus ad nervos minute velutino-puberulis, 13-plinerviis nervo centrali ex 0.25 longitudinis suae nervos adscendentes utrinque 2 alternatim mittente, aliis nervis altero latere 4 altero 5 a basi divaricantibus; petiolo minute velutino-puberulo usque

ad medium vaginante; stirpis masc. pedunculo glabro petiolum multo superante, spica florente quam limbi dimidium paullo longiore, rhachi hirsuta, bractearum pelta glabra in inferis rotunda in superis transverse elliptica, pedicello longo et hirsuto, staminibus 2 antheris ovatis filamenta subaequantibus.

Dioicum, caule plus minusve prostrato 1.5 m longo. Ramuli minutissime velutino-puberuli, spiciferi 3 mm crassi, collenchyma continuum sat crassum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis, cellulae flavidae in cortice et medulla crebrae. Limbi in sicco membranacei crebre pellucido-punctulati, a petiolo 21 cm longi et usque ad 12 cm lati. Petioli 2 cm longi, stipulae extus minutissime puberulae superne ad petiolum attenuatae. Pedunculi usque ad 3.5 cm longi. Spica subflorens cylindrica apice obtusa, 11.5 cm longa 4 mm crassa. Bractearum pelta in inferis 1.5 mm diametro in superis 1 mm longa et 1.5 mm lata. Stamina infera in speciminibus visis monstrosa, nempe cum filamentis dilatatis et antheris rudimentariis.

MINDORO, south of Lake Naujan, *For. Bur. 6751 Merritt*, April, altitude about 100 m.

21. **Piper Ramosii** C. DC. sp. nov.

Foliis breviter petiolatis, ovato-oblongis basi inaequilatera cordatis apice longe et acute attenuato-acuminatis utrinque breviter et sat dense hirtellis lobis basis rotundatis quorum major auriculaeformis, nervo centrali fere a 1 cm supra basin trifido, nervis lateralibus utrinque 2 a basi divaricantibus; petiolo dense hirsuto basi ima vaginante; stirpis masc. pedunculo hirsuto petiolum aequante, spica subflorente quam folii limbus pluries breviore, rhachi hirsuta, bracteae glabrae pelta rotunda centro breviter pedicellata, staminibus 2 antheris reniformibus.

Dioicum. Ramuli teretes, juniores dense hirsuti postea glabri et in sicco pallidi, in 1.5 mm crassis collenchyma continuum haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis nullus. Limbi in sicco membranacei creberrime pellucido-punctulati 10 cm longi 28 mm lati, basis lobi summo petiolo inserti. Petioli superi 3 mm, inferi 11 mm longi. Spica subflorens 35 mm longa, 2 mm crassa. Bracteae pelta 0.5 mm diametro.

LUZON, Province of Rizal, San Isidro, *Bur. Sci. 1755 Ramos*, January.

22. **Piper Merrillii** C. DC. sp. nov.

Foliis modice petiolatis, subobovato-ellipticis basi inaequilatera cordatis latere longiore auriculiformi apice breviter acuminatis, supra tantum ad basin nervi centralis subtus ad nervos nervulosque, hirtellis, 10- vel 11-plinerviis, nervo centrali nervos adscendentes utrinque 2 alternatim mittente quorum superus a 5 cm supra basin solutus, nervis lateralibus utrinque 2 vel 3 a basi solutis quorum superus adscendens et inferi divaricantes ac aliis multo tenuiores; petiolo dorso hirsuto usque ad

limbi latus longius vaginante; stirpis masc. pedunculo quam petiolus breviore hirsuto, spica cylindrica apice obtusa quam folii limbus fere triplo breviore, rhachi hirsuta, bracteae pelta orbicularis glabra centro pedicellata pedicello hirsuto, staminibus 2 antheris sessilibus ovatis; stirpis fem. pedunculo quam petiolus breviore et parce hirtello, spica cylindrica apice obtusa quam folii limbus pluries breviore, rhachi et bractea ut in mare, ovario libero glabro conoideo superne in stilum sat longum attenuato, stigmatibus 3 linearibus brevibus.

Dioicum, in arboribus scandens. Ramuli retrorsum hirsuti 2–3 mm crassi, collenchyma haud libriforme fere continuum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei pellucido-punctulati, usque ad 19 cm longi et ad 9.5 cm lati. Petioli usque ad limbi latus longius 18 mm, inter limbi latera 5 mm longi. Stipulae extus hirtellae. Pedunculi circiter 10 mm longi. Stirpis masc. spica florens fere 6 cm longa et 4 mm crassa, bracteae pelta 1.75 mm diametro, antherae 1 mm longae; stirpis fem. spica florens 2 cm longa 5 mm crassa, bracteae pelta 1 mm diametro.

MINDORO, Baco River, *Merrill 1809*, masc., April, *4038*, fem., March, *McGregor 178*, masc., March. NEGROS, Canlaon Volcano, *Banks s. n.*, March.

Forma **b**.

Limbis minoribus usque ad 10.5 cm longis et 4.7 cm latis.

NEGROS, Mount Silay, *Whitford 1547*, fem.

23. **Piper pseudochavica** C. DC. Prodr. **16**[1] (1869) 351, emend.
Chavica Lessertiana Miq. Syst. Pip. (1843) 270.
Piper Lessertianum C. DC. in Seem. Journ. Bot. 4 (1866) 164, non C. DC. Prodr. **16**[1] (1869) 258.

Foliis breviter petiolatis subobovato-oblongo-ellipticis, basi valde inaequilatera semicordatis altero latere angustiore attenuatis altero auriculaeformibus, apice longe et acute acuminatis, supra glabris subtus basi sat longe et haud dense pilosis, 10-plinerviis nervo centrali ex 2–3.5 cm supra basin nervos 2 adscendentes utrinque mittente, nervis lateralibus altero latere 2 altero 3 a basi solutis quorum extremi tenuissimi; petiolo piloso basi vaginante; stirpis masc. pedunculo glabro quam petiolus pluries longiore, spica subflorente quam folii limbus pluries breviore, rhachi hirsuta, bracteae pelta rotunda glabra, pedicello hirsuto, staminibus 2 antheris ovatis apice subacutis filamentis oblongis brevibus; stirpis fem. pedunculo ut in mare, spica quam folii limbus pluries breviore cylindrica apice obtusa, rhachi et bractea ut in mare, bacca libera oblonga apice obtusa, stigmatibus 3 rotundatis parvis.

Dioicum, scandens. Ramuli longe et haud dense pilosi, spiciferi fere 2 mm crassi, collenchyma continuum haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis centralis canalesque peripherici plures, zona cellularum sclerosarum continua collenchyma circumdans. Limbi

in sicco membranacei minute pellucido-punctulati usque ad 21 cm longi et ad 8 cm lati. Petioli fere 6 mm longi. Pedunculi usque ad 5.5 cm longi. Spica masc. subflorens 4 cm longa et fere 3 mm crassa, bracteae pelta 0.75 mm diametro. Spica fem. matura 3 cm longa et fere 10 mm crassa, bracteae pelta fere 1 mm diametro, baccae condensae 2 mm longae. Stigmata in apice baccae sessilia.

Luzon, Province of Cagayan, *Cuming 1343*, masc.: Province of Tayabas, Lucban, *Elmer 9332*, fem.

Forma b.

Ramulis magis pilosis, limbis usque 18 cm longis et 9 cm latis.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 574*, May.

Forma c.

Ramulis et limbis glabris, petiolis subtus parce pilosis vel glabris, limbis 20 cm longis et 7.5 cm latis; zona cellularum sclerosarum haud continua.

Mindoro, Alag River, *For. Bur. 11411 Merritt*, fem., April. Negros, Canlaon Volcano, *For. Bur. 13679 Curran*, fem., September. Mindanao, District of Davao, Todaya (Mount Apo), *Elmer 11417*, August.

Forma d.

Ramulis glabris, limbis supra glabris, subtus ad nervum centralem parcissime pilosis, 9-ninerviis, 17.5 cm longis et usque ad 3 cm latis, zona cellularum sclerosarum continua.

Mindanao, District of Davao, Mount Apo, *Copeland 1140*, masc., April, epiphytic in the mossy forest, altitude about 2,000 m.

24. **Piper cristatum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 766.
Mindanao, District of Davao, Todaya (Mount Apo), *Elmer 10703*, May.

25. **Piper longistigmum** C. DC. l. c.
Luzon, Province of Tayabas, Lucban, *Elmer 7578*, May.

26. **Piper albidirameum** C. DC. in Perk. Fragm. Fl. Philip. (1905) 153, emend.

Omnino glabrum, foliis modice petiolatis, magnis, ample subobovato-ellipticis, basi ima leviter inaequilatera leviter cordulatis, apice breviter et obtusiuscule acuminatis, a nervo centrali inaequilatis, 7-plinerviis, nervo centrali nervos 2 adscendentes utrinque mittente, quorum supremus a 5–6 cm supra basin solutus, nervis lateralibus adscendentibus 3 vel 4 utrinque a basi solutis; petiolo basi ima vaginante; stirpis fem. pedunculo quam petiolus paullo breviore; spica quam folii limbus pluries breviore, cylindrica apice rotunda, bracteae pelta rotunda centro breviter pedicellata, ovario libero, stigmatibus 3 vel 4 rotundato-ovatis carnosis, bacca globosa.

Dioicum, scandens. Ramuli in sicco albidi vel lutescentes, spiciferi fere 3 mm crassi, collenchyma libriforme in fasciculos discretos dispo-

situm, fasciculi intramedullares 1-seriati, canales lysigenes peripherici nulli. Limbi in sicco rigidi, pallidi et minute pellucido-punctulati, usque ad 25 cm longi et 13 cm lati. Petioli 15–20 mm longi. Spica matura circiter 6 cm longa et 6 mm crassa. Bracteae pelta 1 mm diametro. Stigmata in apice ovarii sessilia. Bacca 2 mm diametro, in sicco lutescens.

MINDANAO, District of Davao, Taumo, *Warburg 14751.* LUZON, Province of Cavite, Mendez Nuñez, *Bur. Sci. 1316 Mangubat,* August: Province of Rizal, Boso-boso, *Bur. Sci. 1118 Ramos,* July: Province of Benguet, Twin Peaks, *Elmer 6430,* June: Province of Tayabas, Lucban, *Elmer 8117.*

Forma **b.**

Limbis superis basi aequilatera rotundatis apice acute acuminatis, ramulis flavescentibus.

MASBATE, *Merrill 3050,* August.

Forma **c.**

Limbis superis basi aequilatera rotundatis apice acute acuminatis, ramulis in sicco subfuscis.

LUZON, Province of Camarines, Adiagnao, *Bur. Sci. 6374 Robinson,* August.

27. **Piper maagnasanum** C. DC. **sp. nov.**

Omnino glabrum, foliis sat longe petiolatis, rotundato-ellipticis basi ima aequilatera levissime cordulatis, apice modice et acute acuminatis, 11-plinerviis; nervo centrali nervos adscendentes utrinque 2 mittente quorum supremus a 4 cm supra basin solutus, nervis lateralibus 3 utrinque a basi solutis quorum 2 adscendentes et externi subadscendentes et tenuissimi, petiolo basi vaginante; stirpis fem. pedunculo quam petiolus pluries breviore; spica submatura quam folii limbus pluries breviore, cylindrica apice rotundata, bracteae pelta rotunda centro brevissime pedicellata, baccis inferne in rhachi immersis superne globosis et glabris, stigmatibus 3 ovato-acutis.

Dioicum. Ramuli in sicco fuscescentes, spiciferi 4 mm crassi, collenchyma libriforme in fasciculos discretos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis centralis canalesque peripherici plures. Limbi in sicco rigidi pellucido-punctulati, usque ad 21 cm longi et 15 cm lati, nervi subtus prominentes. Petioli 4 cm longi et 4 mm crassi. Pedunculi 12 mm longi et 3 mm crassi. Spicae submaturae 3 cm longae et 6 mm crassae. Bracteae pelta 1 mm diametro. Stigmata in apice baccae sessilia.

LUZON, Province of Camarines, Maagnas, *Bur. Sci. 6355 Robinson,* August.

28. **Piper pendulifolium** C. DC. in Elm. Leafl. Philip. Bot. **3** (1910) 768.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 10942.*

29. **Piper puberulinodum** C. DC. l. c. 769.
MINDANAO, District of Davao, Todaya (Mount Apo) *Elmer 11972.*

30. **Piper oophyllum** C. DC. sp. nov.

Foliis modice petiolatis, ovatis basi subaequilatera rotundatis obtusisve apice breviter acuminatis, utrinque glabris, 9-ninerviis, nervo centrali nervos 2 adscendentes 2 alternatim mittente quorum supremus a 1–2 cm supra basin solutus, nervis lateralibus 3 adscendentibus utrinque a basi solutis quorum externi aliis multo tenuiores; petiolo tenuissime puberulo basi ima vaginante; stirpis masc. pedunculo glabro quam petiolus breviore; spica florente quam folii limbus paullo breviore, rhachi pilosula, bracteae glabrae pelta obovato-rotunda centro pedicellata, staminibus 2 antheris parvis rotundatis bivalvatis; stirpis fem. pedunculo ut in mare, rhachi glabra, spica quam folii limbus pluries breviore, cylindrica apice obtusa, bracteae glabrae pelta rotunda centro pedicellata, ovario in rhachi semi-immerso, stigmatibus 3 vel 4 linearibus, baccis inferne cum rhachi concretis, superne rotundatis et glabris.

Dioicum, frutex 3–7-pedalis. Ramuli minutissime puberuli, tenuissime striati, spiciferi in mare 1 mm in femina 2 mm crassi, collenchyma in fasciculos discretos dispositum, in mare haud libriforme, in femina libriforme, fasciculi intramedullares 1-seriati, canales lysigenes peripherici nulli. Limbi in sicco membranacei minute et haud crebre pellucido-punctulati, in mare 9.5–10 cm longi, 4.5–7.5 cm lati, in femina usque ad 13 cm longi et 9.5 cm lati. Petiolo 1.5–2 cm, pedunculi 5–7 mm longi. Spica masc. florens 6 cm longa, usque ad 2 mm crassa, bracteae pelta 1 mm longa. Spica fem. matura 14 mm longa, 5 mm crassa, in sicco fuscescens, bracteae pelta 0.75 mm diametro.

Mindanao, District of Davao, at sea level in coconut groves, *Copeland 333*, masc., March, *320*, fem., March; Santa Cruz, *DeVore & Hoover 233*, masc., April.

31. **Piper petraeum** C. DC. sp. nov.

Foliis breviter petiolatis, oblique ovatis, basi leviter inaequilatera cordulatis apice acute acuminatis, utrinque glabris, 9-nerviis, nervo centrali nervos 2 adscendentes alternatim mittente, quorum supremus ex 1–0.5 cm supra basin solutus, nervis lateralibus utrinque 3 a basi solutis quorum externi aliis multo tenuiores et minus adscendentes; petiolo glabro usque ad medium vaginante; stirpis fem. pedunculo glabro petiolum subaequante; spica florente quam folii limbus pluries breviore, cylindrica apice obtusa, rhachi parce pilosa, bracteae glabrae pelta rotundato-obovata fere centro subsessili; ovario inferne in rhachi immerso et cum ea concreto, glabro, stigmatibus 3 vel 4, rotundatis carnosis.

Frutex in rupibus crescens. Ramuli glabri, in sicco flavicantes, spiciferi fere 2 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei, pellucido-punctulati, circiter 14.5

cm longi et 9 cm lati. Petioli usque ad limbi latus longius 6 mm, inter limbi latera 1 mm longi. Spica florens 17 mm longa et 6 mm crassa.

LUZON, Province of Benguet, Twin Peaks, on rocks in shady places, *Elmer 6430*, May.

32. **Piper Betle** L. Sp. Pl. (1753) 28, ed. 2 (1762) 40.

Foliis modice vel longe petiolatis, superis ovatis basi leviter inaequilatera rotundatis apice acute acuminatis, utrinque glabris, plerumque 7-plinervis, nervo centrali fere e quinta parte longitudinis suae nervos adscendentes 1 vel 2 mittente, nervis lateralibus 2 a basi solutis; petiolo glabra usque ad tertiam ad quartam partem longitudinis vaginante; pedunculo glabro in mare petiolum aequante in femina eum superante; stirpis masc. spica adulta folii limbum eaquante, rhachi hirsuta, bractea glabra rotundata vel obovata centro sessili, staminibus 2 antheris ellipticis cum filamentis brevibus aequilatis; stirpis fem. spica quam folii limbus plus minusve breviore, bractea ut in mare, ovario inferne in rhachi immerso superne umbonato et ut rhachis dense tomentoso, stigmatibus 4 vel 5 lanceolatis.

Dioicum, scandens. Ramuli glabri, spiciferi 2.5 mm crassi, collenchyma continuum vel subcontinuum sparsim libriforme, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis, alii peripherici plures, cellulae fuscescentes in cortice et in medulla creberrimae. Limbi in sicco firmo-membranacei quam minutissime pellucido-punctulati, superi usque ad 10–13 cm longi et 6.5–7.5 cm lati. Petioli 1.5–2.5 cm longi. Stirpis masculae spicae 2 mm, femineae maturae 1 cm et plus crassae.

LUZON, Province of Bataan, Lamao River, in forests, altitude about 100 m, *Merrill 3781*, masc., January, *Whitford 188*, May; Dinalupijan, *Merrill 1561*, December: Province of Laguna, *Elmer 9276*, fem., April. NEGROS, Dumaguete, *Elmer 9573*, fem.

Cultivated in all tropical countries.

Forma **b.**

Piper canaliculatum Opiz in Presl Rel. Haenk. 1 (1828) 156.

Piper Betle Linn. γ. *densum* C. DC. Prodr. 16[1] (1869) 360.

Limbis magis ovatis et basi magis inaequalibus usque ad 14 cm longis et 9 cm latis.

LUZON, *Haenke 69:* Province of Rizal, San Francisco del Monte, *Loher 4565*.

Forma **c.**

Piper philippinense C. DC. l. c. 353.

Limbis superis minoribus usque ad 10 cm longis et ad 5 cm latis, canales lysigenes peripherici in ramulo nulli.

LUZON, Province of Bataan, Lamao River, *Merrill 2526*, fem., June, *Williams 511*, masc.: Province of Cavite, Mendez Nuñez, *Bur. Sci. 1314 Mangubat*, August.

33. **Piper carnistilum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 770.
LUZON, Province of Tayabas, Lucban, *Elmer 9333*.

34. **Piper chaba** Bl. Verh. Bat. Genoots. 11 (1826) 168, *fig.* 7, emend. (non Hunter quoad=*Piper retrofractum* Vahl).
Piper abbreviatum Opiz in Presl Rel. Haenk. 1 (1828) 157.

Omnino glabrum, foliis breviter petiolatis ovato-lanceolatis inferne fere ad tertiam partem longitudinis attenuatis et basi ima aequilatera acutis, apice obtusiuscule acuminatis, utrinque glabris, 5-plinerviis, nervo centrali nervos 2 adscendentes mittente, quorum supremus a 8–15 mm supra basin solutus, nervo laterali adscendente utrinque a basi soluto; petiolo basi ima vaginante, pedunculo petiolum paullo superante; stirpis masc. spica florente quam folii limbus multo breviore, bracteae pelta transverse subelliptica centro pedicellata, staminibus 2, filamentis quam antherae reniformes 4-valvatae brevioribus et angustioribus; stirpis fem. spica quam folii limbus pluries breviore subobovato-oblonga bracteae pelta ut in mare, bacca inferne in rhachi immersa, superne in stilum umbonatum producta, stigmatibus 3 ovato-acutis.

Dioicum, scandens. Ramuli teretes, spiciferi 1–2 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei minute pellucido-punctulati, 8–11 cm longi, 3–4 cm lati. Petioli fere 8 mm, pedunculi usque ad 15 mm longi. Spica masc. 4 cm longa, 3 mm crassa, bractea pelta 0.75 mm longa et paullo latior, in sicco rubescens et margine pallida. Spica fem. submatura 15 mm longa, 8 mm crassa.

LUZON, without definite locality, *Haenke* in herb. Berol., *Warburg 12127*, in herb. Berol., masc.: Province of Rizal, Montalban, Macap River, *Loher 4564*, fem. POLILLO, *Bur. Sci. 9128 Robinson*, fem., in light woods east of the town of Polillo, altitude about 5 m, fruit green. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, fem., September: District of Davao, Todaya, in open forests, fertile damp soil, erect, stem 1 cm thick, *Elmer 11049* fem., *11077*, masc.: Province of Surigao, *Bolster 351*.

Forma **b.**

Limbis superis elliptico-lanceolatis, circiter 11 cm longis et 5 cm latis, nervo laterali supremo a 30 mm supra basin soluto.

MINDANAO, District of Zamboanga, Sax River, *Williams 2130*, fem., February.

Forma **c.**

Limbis circiter 7 cm longis et 2 cm latis, nervo laterali supremo a 7 mm supra basin soluto.

LUZON, Province of Albay, Batan Island, *Bur. Sci. 6231 Robinson*, fem., August.

Forma **d.**
Piper rubripunctulatum C. DC. in Perk. Frag. Fl. Philip. (1905) 158.

Limbis inferne minus attenuatis, usque ad 11 cm longis et 5.5 cm latis, 5-plinerviis in mare, 7-plinerviis in femina, nervo laterali supremo

a 10 mm in mare, a 30 mm in femina supra basin soluto; ramuli in sicco punctulis rubris conspersi. Stirpis fem. spica cylindrica 18 mm longa et immatura 4 mm crassa, bracteae pelta ut in specie.

MINDANAO, District of Davao, *Warburg 14746;* Santa Cruz, *Copeland 1315,* masc., April.

Forma **e.**

Piper parvispicum C. DC. in Perk. Frag. Fl. Philip. (1905) 158.

Limbis quoad formam ut in praecedente sed paullo minoribus; stirpis fem. spica obovato-cylindrica vel cylindrica, submatura usque ad 15 mm longa et 9 mm crassa, bracteae pelta rotunda.

MINDANAO, District of Davao, Mount Dagatpan, *Warburg 14750;* Taumo, *Warburg 14747.*

35. **Piper rhombophyllum** C. DC. Prodr. **16**[1] (1869) 352, emend.

Omnino glabrum, foliis breviter petiolatis, rhombeo-lanceolatis, basi aequilatera cuneatis apice longe acuminatis acumine obtusiusculo, 5-plinerviis nervo centrali a 15 mm supra basin trifido aliis nervis a basi solutis adscendentibus; petiolo basi ima vaginante, stirpis fem. pedunculo petiolum multo superante, spica submatura quam folii limbus pluries breviore cylindrica apice rotundata, bracteae pelta lunulata centro pedicellata, ovario immerso superne in stilum oblongum producto, stigmatibus 3 oblongis apice acutis.

Dioicum. Ramuli teretes laeves, spiciferi 1.5 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis centralis peripherici nulli. Limbi in sicco membranacei creberrime pellucido-punctulati 10 cm longi 32 mm lati, petioli 5 mm, pedunculi 10–12 mm longi. Spica submatura 15 mm longa 7 mm crassa stilis echinata. Bracteae pelta 0.75 mm lata in sicco rubropunctulata.

LUZON, Province of Albay, *Cuming 834,* herb. Boiss., Berol., Manila: Province of Laguna, *Elmer 9279.*

36. **Piper Langlassei** C. DC. in Ann. Cons. Jard. Bot. Genève **2** (1898) 273, emend.

Foliis breviter petiolatis, elliptico-lanceolatis, basi inaequilatera acutis apice sat longe acuminatis acumine obtusiusculo, utrinque glabris, 7-plinerviis, nervo centrali nervos 2 adscendentes alternatim mittente quorum supremus circiter a 7 mm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis; petiolo glabro basi ima vaginante; stirpis fem. pedunculo glabro petiolum superante, spica matura folii dimidium aequante vel paullo superante, cylindrica, rhachi parce pilosa, bracteae glabra pelta rotunda centro sat longe pedicellata, ovario glabro basi in rhachi leviter immerso, stigmatibus 3–5 minutissimis ovato-acutis, eorum apicibus cito deciduis, baccis maturis alte connatis.

Dioicum, scandens. Ramuli graciles, laeves, glabri, spiciferi circiter

1 mm crassi, collenchyma subepidermidale fere continuum, interrupte et fere omnino libriforme, fasciculi intramedullares 2-seriati, canalis lysigenis centralis et canales peripherici multi. Limbi in sicco rigidi, pallidi, pellucido-punctulati, 6–7 cm longi, 2.5–4 cm lati. Petioli usque ad limbi latus longius 3 mm, inter limbi latera fere 5 mm longi. Pedunculi adulti 1.5–2 cm longi. Spica matura 3.5 cm longa, 7 mm crassa. Bracteae pelta 0.5 mm diametro. Stigmata apicibus delapsis stigma simplex simulantibus.

LUZON, Province of Laguna, base of Mount Banajao, in calcareous soil, *Langlassé 297*, October.

37. **Piper breviamentum** C. DC. sp. nov.

Foliis modice petiolatis elliptico-lanceolatis basi aequilatera acutis apice acute acuminatis, utrinque glabris, 9-ninerviis nervo centrali nervos 2 adscendentes utrinque mittente quorum supremus a 2 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis; petiolo basi ima vaginante; stirpis fem. pedunculo glabro petiolum aequante, spica subflorente subglobosa quam folii limbus pluries breviore, rhachi hirsuta, bracteae glabrae pelta lunulata pedicello lato, ovario inferne in rhachi immerso superne in stilum conicum carnosum glabrum producto, stigmatibus 3 parvis ovato-rotundis hirtellis.

Dioicum, in arboribus scandens. Ramuli glabri in sicco cinerescentes, spiciferi fere 2 mm crassi, in 5 mm crassis collenchyma sparsim libriforme in fasciculos discretos dispositum, fasciculi intramedullares 1-seriati. Limbi in sicco cinerescentes membranacei pellucido-punctulati, 12 cm longi 6 cm lati. Petioli pedunculique usque ad 2 cm longi. Spica subflorens 1 cm longa. Bracteae pelta 0.75 mm lata, sicca triangularis, madefecta lunulata.

MINDANAO, District of Zamboanga, Sax River, *Williams 2104*, altitude about 150 m, February.

38. **Piper baguionum** C. DC. Elm. Leafl. Philip. Bot. 3 (1910) 771.
LUZON, Province of Benguet, Baguio, *Elmer 5874, 8784*.

39. **Piper bathycarpum** C. DC. in Perk. Frag. Fl. Philip. (1905) 153, emend.

Foliis modice petiolatis, ovato-lanceolatis basi leviter inaequilatera acutis apice acute acuminatis, utrinque glabris, 7-plinerviis, nervo centrali nervos 2 adscendentes alternatim mittente quorum supremus a 1.5 cm supra basin solutus, nervo laterali aliis tenuiore utrinque a basi soluto; petiolo glabro paullo ultra basin vaginante; stirpis fem. pedunculo glabro quam petiolus duplo et plus longiore; spica submatura quam folii limbus dimidio breviore, rhachi dense fulvescenti-hirsuta, bractea glabra semilunari centro sessili, ovario inferne in rhachi profunde immerso superne paullo emerso et ut rhachis hirsuto, stigmatibus 4 vel 5, breviter oblongis et apice acutis.

Dioicum. Ramuli glabri, tenues, spiciferi fere 1 mm crassi, collenchyma continuum sparsim et parce libriforme, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis alii peripherici, cellulae fuscae in cortice et in medulla creberrimae. Limbi in sicco rigido-membranacei inconspicue pellucido-punctulati, usque ad 11 cm longi et 5.5 cm lati. Petioli fere 10 mm, pedunculi usque ad 30 mm longi. Spica submatura fere 5 mm crassa. Bractea 1 mm lata. Stigmata in apice ovarii sessilia. Species P. Betlei proxima, fere hujus forma.

JOLO, *Warburg 14844.*

40. **Piper cagayanense** C. DC. sp. nov.

Foliis breviter petiolatis, elliptico-lanceolatis, utrinque glabris, 7-plinerviis, nervo centrali a 12–15 mm supra basin trifido, aliis nervis a basi solutis et adscendentibus; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro petiolum subaequante, spica subflorente quam folii limbus pluries breviore, rhachi hirtella, bracteae glabra pelta rotunda centro breviter pedicellata, staminibus 2 antheris rotundatis.

Dioicum, in arboribus scandens. Ramuli glabri, spiciferi 1 mm crassi, costulati, collenchyma subcontinuum in costis valde incrassatum, haud libriforme. Limbi in sicco membranacei minutissime pellucido-punctulati, usque ad 8.5 cm longi et 3.5 cm lati. Petioli 5 mm longi. Spicae subflorentes circiter 2 cm longae, 1.75 mm crassae.

LUZON, Province of Cagayan, Pamplona, *Bur. Sci. 7484 Ramos*, March.

41. **Piper firmolimbum** C. DC. sp. nov.

Foliis modice petiolatis, oblongo-ovatis utrinque glabris, superis basi ima fere aequilatera acutis apice breviter acuminatis, 7-plinerviis, nervo centrali nervos 2 adscendentes alternatim mittente, quorum supremus a 2–3 cm supra basin solutus, nervis lateralibus 2 utrinque a basi solutis, quorum externi patulo-subadscendentes; petiolo glabro basi ima vaginante, stirpis masc. pedunculo glabro petiolum fere aequante, spica florente limbi dimidium superante, rhachi hirsuta; bracteae pelta rotunda glabra, pedicello hirsuto, staminibus 2, antheris reniformibus filamenta fere aequantibus.

Dioicum. Ramuli glabri, spiciferi 1 mm crassi, fuscescentes, postea albicantes, collenchyma continuum zona interna partim libriforme, fasciculi intramedullares 1-seriati, canales lysigenes numerosi quorum unus centralis, alii peripherici, cellulae fuscae in cortice et in medulla crebrae. Limbi in sicco firmi, minute et inconspicue pellucido-punctulati, superi usque ad 11 cm longi et 5.5 cm lati. Petioli 18 mm, pedunculi 25 mm longi. Limbi inferiores majores basi aequilatera rotundati, usque ad 16 cm longi et 10 cm lati cum nervis lateralibus oppositis. Spicae florentes 10.5 cm longae, 2 mm crassae. Bracteae pelta 1 mm diametro.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, April.

42. **Piper malindangense** C. DC. sp. nov.

Foliis modice petiolatis, oblongo-elliptico-lanceolatis, inferne attenuatis et basi aequilatera acutis, apice acute et sat longe acuminatis, utrinque glabris, 7-plinerviis nervo centrali nervos adscendentes 2 mittente quorum supremus ex 3.5 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro quam petiolus breviore, spica florente limbi dimidium fere aequante, rhachi hirsuta, bracteae glabrae pelta rotunda centro pedicellata, staminibus 2, antheris ellipticis parvis.

Dioicum. Ramuli glabri in sicco fusci, spiciferi 1 mm crassi, collenchyma partim libriforme in fasciculos discretos dispositum, fasciculi intramedullares 1-seriati, canales lysigenes peripherici nulli. Limbi in sicco membranacei opaci indistincte pellucido-punctulati, usque ad 12.5 cm longi et 4.5 cm lati. Petioli 10 mm, pedunculi 3 mm longi. Spica florens circiter 5.5 cm longa et in sicco 1.75 mm crassa. Antherae juveniles 4-loculares, filamenta lata.

Mindanao, Province of Misamis, Mount Malindang, *For. Bur. 4758 Mearns & Hutchinson*, May.

43. **Piper podandrum** C. DC. sp. nov.

Foliis breviter petiolatis, anguste subovato-lanceolatis basi aequilatera subrotundatis apice longe attenuato-acuminatis et summo apice acutis, utrinque glabris, 5-plinerviis nervo centrali fere ex 1 cm supra basin nervum adscendentem utrinque mittente nervoque laterali adscendente brevi et tenui utrinque a basi soluto; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro petiolum aequante, spica quam folii limbus pluries breviore cylindrica, rhachi dense hirtella, bracteae glabrae pelta rotunda, pedicello brevi, staminibus 2 filamentis post anthesin rhachi processu brevi stipitatis, antheris reniformibus parvis.

Dioicum, scandens. Ramuli glabri, juniores costulati dein fere teretes, spiciferi 1 mm crassi, collenchyma in fasciculos discretos in costulis dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes nulli. Limbi in sicco membranacei minute pellucido-punctulati, usque ad 9 cm longi et ad 10 mm lati. Petioli 5 mm longi. Spica florens usque ad 35 mm longa et 1.5 mm crassa. Bracteae pelta 0.75 mm diametro.

Luzon, Province of Zambales, Mount Tapulao, *For. Bur. 8141 Curran & Merritt*, December, *Bur. Sci. 5053 Ramos*, December.

44. **Piper viminale** Opiz, in Reliq. Haenk. 1 (1828) 150, *tab. 26;* Miq. Syst. Pip. (1843) 336; C. DC. Prodr. 16[1] (1869) 377.

Piper radicans Opiz l. c. 159 (non Vahl).

Foliis breviter petiolatis, anguste ovato-lanceolatis basi aequilatera acutis apice longe attenuatis et summo apice obtusiusculis, junioribus subtus basi in nervo centrali puberulis, cito utrinque glabris, 5-plinerviis, nervo centrali nervos 2 adscendentes alternatim mittente quorum

supremus fere a 5 mm supra basin solutus sursumque nervulos numerosos patulos et sat validos mittente, nervo adscendente brevi et tenui utrinque a basi soluto; petiolo ciliato basi ima vaginante; stirpis masc. pedunculo puberulo petiolum paullo superante, spica quam folii limbus pluries breviore, rhachi hirsuta, bracteae pelta rotunda margine ciliata centro pedicellata, pedicello hirsuto; staminibus 2 antheris ovatis exsertis quam filamenta brevioribus.

Dioicum. Ramuli vetustiores subverruculosi et glabri, juniores leviter striolati, praesertim altero latere pilosuli, spiciferi in sicco 0.5 mm crassi, collenchyma libriforme in fasciculos discretos tenues dispositum, canalis lysigenis unicus centralis. Limbi in sicco membranacei, minute pellucido-punctulati, superi usque ad 10 cm longi et 1.5 cm lati. Petioli 4 mm, pedunculi 7 mm longi. Spica florens 1 cm longa.

LUZON, without definite locality, *Haenke 78* in herb. Vindob.: Province of Bataan, Lamao River, *Williams 227*, November.

45. **Piper philippinum** Miq. Syst. Pip. (1843) 322, p. p.

Foliis breviter petiolatis, ovato-ellipticis basi ima aequilatera obtusis vel acutis apice breviter et acute acuminatis, utrinque glabris, 7-plinerviis, nervo centrali nervos 2 adscendentes mittente quorum supremus a 2.5–3.5 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro quam petiolus paullo longiore, spica florente quam folii limbus breviore, rhachi pilosa, bracteae glabrae pelta rotunda centro pedicellata, staminibus 2, antheris rotundatis quam filamenta multo brevioribus.

Dioicum. Ramuli glabri, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes pauci quorum unus centralis et 1 vel 2 peripherici. Limbi in sicco firmi, fuscescentes, usque ad 14 cm longi et 67 mm lati. Petioli usque ad 10 mm, pedunculi usque ad 12 mm longi. Spica florens 8 cm longa, 2 mm crassa. Rhachis canali lysigeni centrali ac peripheric is pluribus percursa. Bracteae pelta fere 1.25 mm diametro, rigida.

LUZON, Province of Albay, *Cuming 912*.

46. **Piper Jagori** C. DC. Prodr. 16[1] (1869) 358 (*P. Jayeri*, sphalm.), emend.

Foliis breviter petiolatis, elliptico-oblongis, basi ima aequilatera cordulatis apice acute attenuatis, 7-plinerviis, nervis subtus prominulis, centrali nervos adscendentes utrinque 2 alternatim vel subalternatim mittente, quorum supremus a 3.5 cm, inferi paullo supra basin soluti, nervo laterali adscendente utrinque a basi soluto; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro petiolum paullo superante, spica florente quam folium fere triplo breviore, rhachi pubescente, bracteae pelta glabra rotundata centro subsessili, staminibus 2, filamentis brevissimis.

Dioicum. Ramuli glabri, spiciferi 1.5 mm crassi, collenchyma subcontinuum, haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco rigidi, nitiduli, opaci, fere 15

cm longi et 5 cm lati. Petioli 7–10 mm, pedunculi 12 mm longi. Spica florens 5 cm longa et fere 3 mm crassa.

LUZON, *Jagor 162*, herb. Berol.

47. **Piper polycladum** C. DC. sp. nov.

Foliis sat longe petiolatis, ovatis inferne subattenuatis et basi ima leviter inaequilatera acutis apice acute acuminatis utrinque glabris, 7-plinerviis nervo centrali nervos 2 adscendentes mittente quorum supremus a 5 mm supra basin solutus, nervis lateralibus subadscendentibus utrinque 2 a basi solutis; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro petiolum paullo superante, spica quam folii limbus paullo breviore apice subacuta, rhachi hirsuta, bracteae pelta rotunda, glabra et margine lacinulata, pedicello hirsuto; staminibus 2, antheris rotundis quam filamenta brevioribus.

Dioicum, caulis circiter 2.5 m longus, ramuli numerosi in sicco nigri, spiciferi 1 mm crassi, collenchyma in fasciculos a latere valde elongatos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco nigrescentes firmi pellucido-punctulati, usque ad 63 mm longi et 32 mm lati. Petioli superi usque ad limbi latus longius 10 mm inter limbi latera 1 mm longi. Pedunculi 15 mm longi. Spica florens 45 mm longa, 3 mm crassa. Bracteae pelta fere 1 mm diametro. Antherae 0.25 mm longae, 4-valvatae.

LUZON, Province of Benguet, Baguio, *Williams 1134*, June.

48. **Piper corylistachyon** C. DC. Prodr. 16[1] (1869) 346, emend.

Omnino glabrum, foliis modice petiolatis, oblongo-ovatis basi ima inaequilatera utrinque obtusis vel rotundatis apice acute et sat longe acuminatis, penninerviis, nervo centrali nervos adscendentes plerumque alternos utrinque 4 mittente, quorum supremus fere a 5 cm supra basin solutus; petiolo basi ima vaginante; pedunculo quam petiolus fere duplo breviore; stirpis masc. spica quam folii limbus triplo-quadruplo breviore, cylindrica apice obtusa rhachi villosa, bracteae pelta glabra obovata inferne subattenuata, centro pedicellata, pedicello villoso, staminibus 3 antheris oblongis, connectivo ultra thecas distincte producto carnoso apice obtuso; stirpis fem. spica cylindrica carnosa apice obtusa, quam folii limbus pluries breviore, bractea ut in mare, baccis liberis dense confertis, parvis, ovatis et summo apice mucronulatis, stigmatibus 4 linearibus acutis.

Dioicum, scandens. Ramuli cinerescentes vel subfuscescentes, spiciferi circiter 3 mm crassi, collenchyma in fasciculos discretos a latere elongatos dispositum et haud libriforme, fasciculi intramedullares 2–3-seriati, canalis lysigenis centralis, et canales peripherici plures, cellulae fuscae in cortice et medulla crebrae. Limbi in sicco membranacei, creberrime pellucido-punctulati, 15–17 cm longi, 6–7.5 cm lati. Petioli usque ad limbi latus longius fere 12 mm, inter limbi latera 5 mm longi. Pedun-

culi 6 mm longi. Spica masc. usque ad 5 cm longa et 4 mm crassa, fem. usque ad 4 cm longa et 10 mm crassa. Bacca circiter 1.5 mm longa.

LUZON, Province of Ilocos Sur, *Cuming 1144*, masc.: Province of Bataan, Lamao River, *Whitford 1280*, masc.: Province of Pampanga, Mount Abu, *Bur. Sci. 1989 Foxworthy;* Arayat, *Merrill 1448*, fem.: Province of Laguna, *Elmer 8201*, masc.; Lilio, *Bur. Sci. 6014 Robinson*, fem.: Province of Tayabas, Infanta, *Whitford 852*, masc., *Bur. Sci. 6805*, masc., *6806*, fem., *Robinson:* Province of Nueva Ecija, San Jose to Carranglang, *Merrill 238:* Province of Albay, Mount Mayon, *Bur. Sci. 6462 Robinson*, fem. POLILLO, *Bur. Sci. 6918, 6966 Robinson*, fem., *Bur. Sci. 10235 McGregor.* MINDORO, *For. Bur. 5512 Merritt.* CEBU, Catmon, *For. Bur. 12434 Danao*, fem.

Forma **b.**

Piper Warburgii C. DC. in Perk. Frag. Fl. Philip. (1905) 159, quoad specimina feminea.

Limbis utrinque magis rotundatis, 15–17 cm longis, 8–11 cm latis.

LUZON, Province of Tayabas, Sampaloc, *Warburg 13115:* Province of Pampanga, Mount Arayat, *Bolster 21*, masc.: Province of Rizal, Tanay, *Merrill 2306*, fem.: Province of Albay, Carcraray Island, Coal Harbor, *Bur. Sci. 6407 Robinson.* LEYTE, *For. Bur. 11572 Whitford*, masc. MARINDUQUE, collector unknown, fem.

Forma **c.**

Piper corylistachyon β magnifolium C. DC. Prodr. l. c. ?

Piper Warburgii C. DC. l. c. quoad specimina mascula.

Piper Usterii C. DC. in Usteri Beitr. Kenn. Philip. Veg. (1905) 125.

Limbis basi leviter inaequilatera utrinque acutis, usque ad 19 cm longis et 9 cm latis, ramulis in sicco fuscis.

LUZON, Province of Tayabas, Atimonan, *Whitford 733*, masc.: Province of Camarines, Nueva Caceres, *For. Bur. 11332 Curran.* MINDORO, Bongabong River, *For. Bur. 4113 Merritt;* Lake Naujan, *For. Bur. 6875 Merritt;* Baco River, *McGregor 331*, fem. SAMAR, Lanang, *Merrill 5236*, fem. GUIMARAS, *Usteri.*

Found also in New Guinea.

Forma **d.**

Piper luzonense C. DC. Prodr. l. c. 350.

Limbis basi fere aequilatera cordatis, 12–15 cm longis, 9–10 cm latis.

LUZON, *Jagor 722* in herb. Berol.

Forma **d, 2.**

Spicis maturis brevioribus et crassioribus, 3 cm longis, 5 mm crassis, bracteae pelta subangulosa.

LUZON, Province of Tayabas, Atimonan, *Gregory 110*, fem., in thickets.

49. **Piper retrofractum** Vahl Enum. 1 (1804) 314; C. DC. in Urban Symb. Antil. 3:212.

Chavica officinarum Miq. Syst. Pip. (1843) 236, Illustr. (1844) 39, *t. 34.*

Piper officinarum C. DC. Prodr. 16[1] (1869) 356.

Omnino glabrum, foliis breviter petiolatis, oblongo- vel ovato-ellipticis, basi aequilatera vel leviter inaequilatera acutis vel obtusis vel cordulatis, apice acute acuminatis attenuatisve, penninerviis nervo centrali usque

ad tertiam partem longitudinis suae vel tantum usque ad 1 cm supra basin nervos adscendentes 3 et usque ad $\frac{2}{3}$ longitudinis nervulos validos magis patulos utrinque mitente; petiolo basi ima vaginante; pedunculo quam petiolus paullo longiore vel paullo breviore; stirpis masc. spica florente quam folii limbus breviore, bractea rotunda centro sessili, coriacea, staminibus 2 vel 3, plerumque 2, antheris oblongis et subtetragonis filamentis brevissimis; stirpis fem. spica matura quam folii limbus pluries breviore, cylindrica, bractea ut in mare, ovario inferne in rhachi immerso superne libero, stigmatibus 3 ovatis brevibus, bacca superne semiglobosa.

Dioicum, scandens. Ramuli spiciferi in femina usque ad 2 mm crassi, tenuiores in mare, collenchyma haud libriforme in fasciculos sat crassos zona peripherica tenui conjunctos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis, cellulae sclerosae interfasciculares cum phloemate fasciculorum periphericorum continuae. Limbi in sicco firmo-membranacei, minute pellucido-punctulati, 8.5–16 cm longi, 3.5–6.5 cm lati. Petioli usque ad limbi latus longius 5–10 mm, inter limbi latera usque ad 5 mm longi. Pedunculi usque ad 15 mm longi. Bractea fere 1.5 mm diametro. Antherae quadrivalvatae rimis lateralibus.

Luzon, Province of Ilocos Norte, *Cuming 1248*, masc.: Province of Bataan, Mount Mariveles, *Merrill 3165, For. Bur. 57 Barnes, Elmer 6862, For. Bur. 1911 Borden, Williams 302:* Province of Nueva Ecija, Cabanatuan, *Bur. Sci. 5294 Mc-Gregor:* Province of Cagayan, Tabuc, *Bolster 157*, all fem.: Province of Nueva Vizcaya, Dupax, *Bur. Sci. 8239 Ramos*, masc.: without definite locality, *Langlassé 13*, fem. Palawan, *Bur. Sci. 851 Foxworthy*, masc., *Bur. Sci. 190 Bermejos*, fem. Babuyanes Islands, Camiguin, *Bur. Sci. 4092 Fénix*, masc. Mindoro, Calapan, collector unknown, masc., *For. Bur. 5512 Merritt:* Puerto Galera, *Merrill 3342;* Baco, *Merrill 1238*, all fem.

This species is cultivated in all the tropical countries of the old world and has even been introduced into the West Indies.

Forma **b.**

Limbis basi leviter inaequilatera cordatis apice acute acuminatis, 7-plinerviis, nervo centrali nervos 2 adscendentes opposite aut subopposite mittente quorum supremus fere a 4 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis, cellulis sclerosis interfascicularibus nullis.

Luzon, Province of Bataan, Duale, *For. Bur. 20039 Topacio*, altitude 70 m, berries red, local name *subon-manoc* (Tagalog).

50. **Piper penninerve** C. DC. in Perk. Frag. Fl. Philip. (1905) 157.

Omnino glabrum, foliis breviter petiolatis, magnis, elliptico-lanceolatis inferne attenuatis et basi aequilatera acutis apice acute et sat longe acuminatis, nervo centrali ultra medium suum nervos adscendentes utrinque 9 vel 10 mittente; petiolo basi ima vaginante, spicis in specimine viso juvenilibus, bractea orbiculari centro pedicellata.

Ramuli spiciferi fere 3 mm crassi, collenchyma continuum haud libriforme cellulis fuscis intermixtum; fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis alii peripherici. Limbi in sicco membranacei minute pellucido-punctulati, fere usque ad 20 cm longi et ad 8.5 cm lati. Petioli usque ad 12 mm longi. Pedunculi in specimine juveniles quam petioli paullo breviores, spicae vix 1 cm longae verisimiliter masculae.

MINDANAO, District of Davao, Mount Dagatpan, *Warburg 14744*, in mixed forests.

51. **Piper striatum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 772.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 11764*, September.

52. **Piper oblongibaccum** C. DC. l. c. 773.
NEGROS, Dumaguete, Cuernos Mountains, *Elmer 8456*, March.

53. **Piper Williamsii** C. DC. sp. nov.

Foliis modice petiolatis, rotundato-ovatis basi aequilatera rotundatis apice acute acuminatis, supra glabris subtus tantum ad nervos minutissime puberulis, 9-ninerviis nervo centrali nervos adscendentes utrinque 2 mittente quorum supremus a 2.5 cm supra basin solutus, nervis lateralibus subadscendentibus utrinque 2 a basi solutis quorum externi tenuissimi; petiolo minutissime puberulo basi ima vaginante; stirpis fem. pedunculo glabro quam petiolus multo breviore, spica quam folii limbus pluries breviore, matura elliptica, rhachi glabra, bractea rotunda subsessili glabra, baccis inferne in rhachi immersis superne umbonatis et glabris, stigmatibus 3 vel 4 ovatis et parvis.

Dioicum, in arboribus scandens. Ramuli glabri, spiciferi 1 mm crassi, in 7 mm crassis collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis nullus. Limbi in sicco membranacei creberrime pellucido-punctulati, usque ad 13 cm longi et 9 cm lati. Spica matura in sicco 3 cm longa et 12 mm crassa, fuscescens, bracteae pelta 1 mm diametro. Stigmata in apice baccae sessilia.

MINDANAO, District of Davao, Santa Cruz, *Williams 2750*, April.

54. **Piper Allenii** C. DC. sp. nov.

Foliis parvis modice petiolatis, ovato-ellipticis basi ima leviter inaequilatera acutis apice acute acuminatis, supra glabris subtus velutino-puberulis, 7-plinerviis, nervo centrali nervos adscendentes 2 alternatim mittente quorum supremus a 1 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis; stirpis fem. pedunculo velutino-puberulo quam petiolus paullo longiore, spica florente quam folii limbus pluries breviore, cylindrica apice obtusa, rhachi puberula, bracteae glabrae pelta rotunda, ovario glabro libero, stigmatibus 4 linearibus.

Dioicum. Ramuli juniores velutino-puberuli dein glabri, spiciferi 0.75 mm crassi, collenchyma in fasciculos discretos dispositum et haud libri-

forme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei, minutissime et inconspicue pellucido-punctulati, superi 6 cm longi et 26 mm lati. Petioli usque ad limbi latus longius 3 mm, inter limbi latera 7 mm longi. Spica florens 6 mm longa, 3 mm crassa. Flores in vivo albi. Bracteae pelta 0.5 mm diametro. Stigmata in apice ovarii sessilia.

MINDANAO, Province of Surigao, *Allen 152*, in deep shade, moist places, July.

55. **Piper sibulanum** C. DC. in Perk. Frag. Fl. Philip. (1905) 158, emend.

Foliis modice petiolatis, suboblique rotundato-ovatis basi ima aequilatera acutis apice breviter et obtusiuscule acuminatis, supra glabris subtus ad nervos minutissime puberulis, 9-ninerviis nervo centrali nervos adscendentes 2 alternatim mittente quorum supremus a 22 mm supra basin solutus, nervis lateralibus adscendentibus utrinque 3 a basi solutis; petiolo minutissime puberulo basi ima vaginante; stirpis masc. pedunculo minutissime puberulo quam petiolus fere triplo breviore; spica quam limbi dimidium breviore, rhachi glabra, bracteae glabrae pelta rotunda centro pedicellata, staminibus 2, antheris minutis ellipticis bivalvatis, filamentis cum antheris aequilatis et eis paullo longioribus.

Dioicum. Ramuli juniores minutissime puberuli, cito glabri, spiciferi 2.5 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes nulli. Limbi in sicco membranacei pellucido-punctulati, 10–11 cm longi, 7–8 cm lati. Petioli 2 cm longi. Spica florens 3 cm longa, 2 mm crassa. Bracteae pelta 0.75 mm diametro. In specimine viso spica exstat sparsim tumefacta, tumoribus globosis amileum continentibus et baccas mire simulantibus.

MINDANAO, District of Davao, in forests on the coast, *Warburg 14742*.

56. **Piper malarayatense** C. DC. sp. nov.

Foliis modice petiolatis, oblongo-ovatis basi aequilatera rotundatis apice acute et sat longe acuminatis, supra glabris subtus ad nervos hirtellis, 9-ninerviis, nervo centrali nervos 2 adscendentes alternatim mittente quorum supremus a 1.5 cm supra basin solutus, nervis lateralibus 3 a basi solutis; petiolo dense hirtello usque ad dimidium longitudinis vaginante; stirpis masc. pedunculo glabro petiolum paullo superante, spica florente limbi dimidium fere aequante, rhachi pilosa, bracteae glabrae pelta rotunda, centro pedicellata, staminibus 2, antheris reniformibus.

Dioicum, scandens. Ramuli glabri, spiciferi 1.5 mm crassi, collenchyma continuum sparsim libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei epunctulati, superi 11 cm longi, 5 cm lati, inferi paullo majores, rotundato-ovati basi cordati et subtus ubique sat dense hirtelli. Petioli superi 22

mm, pedunculi 30 mm longi. Spica florens 6.5 cm longa, 2 mm crassa. Bracteae pelta 1 mm diametro. An P. Betlei forma?

LUZON, Province of Batangas, Mount Malarayat, *Copeland s. n.*, February.

57. **Piper siassiense** C. DC. sp. nov.

Foliis superis parvis modice petiolatis, ovatis basi ima aequilatera subacutis apice acute acuminatis, supra glabris subtus ad nervos minute velutinis, 5-plinerviis, nervo centrali a 4 mm supra basin trifido; petiolo velutino-puberulo basi ima vaginante; stirpis masc. pedunculo glabro petiolum superante, spica quam folii limbus multo breviore, rhachi hirtella, bracteae pelta glabra transverse elliptica centro pedicellata, pedicello hirtello, staminibus 2 antheris ellipticis bivalvatis.

Dioicum, a caule inferne repente rami circiter 35 cm longi surgentes. Ramuli juniores minutissime puberuli cito glabri, spiciferi 0.5 mm crassi, collenchyma in fasciculos discretos dispositum, haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei tantum minutissime pellucido-punctulati, superi usque ad 72 mm longi et ad 30 mm lati, inferiores conformes usque ad 10 cm longi et 4.5 cm lati, infimi rotundati basi cordati usque ad 8 cm longi. Petioli 5 mm, pedunculi 7 mm longi. Spica florens 10 mm longa, 2 mm crassa. Bracteae pelta transverse 1 mm lata. An P. Allenii masc.?

SIASSI (Sulu Archipelago), in coconut groves, *Merrill 5311*, October.

58. **Piper laxirameum** C. DC. in Elm. Leafl. Philip. Bot. **3** (1910) 775.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 10503*, May.

59. **Piper delicatum** C. DC. l. c. 774.

Foliis breviter petiolatis, anguste ovato-lanceolatis, inferne subattenuatis et basi ima aequilatera vel leviter inaequilatera acutis apice acute et sat longe acuminatis, supra glabris vel ad nervos parcissime puberulis, 5-plinerviis nervis adscendentibus, centrali a 5 mm supra basin trifido, nervo laterali utrinque a basi soluto; petiolo puberulo basi ima vaginante; pedunculo glabro petiolum fere aequante; stirpis masc. spica florente quam folii limbus pluries breviore, rhachi hirtella; bracteae glabrae pelta rotunda, pedicello brevi et lato; staminibus 2, antheris rotundatis; stirpis fem. spica matura quam folii limbus pluries breviore cylindrica apice obtusa, bracteae glabrae pelta rotunda centro subsessili, rhachi ut in mare; ovario libero rotundato, glabro, apice brevissime attenuato, stigmatibus 3 vel 4 linearibus, bacca ovata apice subacuta.

Frutex delicatus, ad arbores parvas scandens. Ramuli juniores hirtelli, in sicco fusci, adulti glabri et pallidi, teretes, spiciferi 1 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes nulli, cellulae fuscae magnae in cortice sparsae. Limbi in sicco tenuiter membranacei, minute et creberrime pellucido-punctulati, usque ad 8 cm longi et 2.5 cm lati.

Petioli 6 mm longi. Spica fem. baccifera 15 mm longa, 7 mm crassa, in vivo erecta et rubra. Ovarium basi late sessile. Bacca 2 mm longa.

Luzon, Province of Benguet, Mount Tonglon (Santo Tomás), altitude about 2,000 m, *Elmer 8583*, masc., *6274* fem., *For. Bur. 11092 Whitford*, masc., *For. Bur. 4964 Curran*, fem., *Merrill 4820*, fem.; Baguio, *Elmer 8359*, fem.: District of Lepanto, Mount Data, *Merrill 4494*, fem., *Bur. Sci. 5461 Ramos*, fem.

β glabrum C. DC. var. nov.

Ramulis foliis et spicis glabris, stigmatibus ovato-acutis brevioribusque.

Luzon, Province of Benguet, Mount Tonglon (Santo Tomás), *Williams 1216*, *Bur. Sci. 5403 Ramos*, *For. Bur. 15604 Curran*, masc.; Pauai, altitude about 2,100 m, *Bur. Sci. 4454 Mearns*, *Bur. Sci. 8497 McGregor*, fem.: District of Lepanto, Mount Data, *For. Bur. 15997 Bacani*.

60. **Piper denudatum** Opiz in Reliq. Haenk. 1 (1828) 158, emend.
Rhyncholepsis Haenkeana Miq. Syst. Pip. (1843) 284.

Foliis brevissime petiolatis, superis elliptico-lanceolatis basi subaequilatera acutis apice longe et acute acuminatis supra glabris subtus ad nervos pilosis, 8-plinerviis, nervo centrali nervos 2 adscendentes alternatim mittente quorum supremus fere a 2.5 cm supra basin solutus, nervis lateralibus adscendentibus altero latere 3 altero 2 a basi solutis; petiolo piloso; pedunculo glabro quam petiolus longiore; stirpis fem. spica quam folium fere triplo breviore, baccis liberis globosis.

Dioicum. Ramuli villosi. Limbi juniores utrinque pilosi, adulti supra glaberrimi, superi usque ad 18 cm longi et 7 cm lati; inferi oblongo-ovati basi aequilatera subrotundati apice longe et acute acuminati, usque ad 8.5 cm lati (ex Opiz l. c. et quoad folia ex Opiz herb.)

Luzon, Province of Sorsogon, *Haenke*, fide Opiz l. c.

61. **Piper longivaginans** C. DC. sp. nov.

Foliis modice petiolatis, elliptico-lanceolatis, basi ima levissime inaequilatera acutis, apice acute acuminatis, supra glabris subtus ad nervos nervulosque minute puberulis, 7-plinerviis, nervo centrali nervos adscendentes utrinque 2 mittente quorum supremus a 2.5 cm supra basin solutus, nervo laterali adscendente utrinque a basi soluto; petiolo minutissime puberulo usque ad limbi latus brevius vaginante; stirpis fem. pedunculo glabro petiolum aequante, spica matura quam folii limbus pluries breviore, rhachi hirsuta, bracteae pelta glabra rotunda, baccis inferne in rhachi immersis superne liberis et ovato-acutis.

Dioicum. Ramuli glabri, spiciferi 1 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei, creberrime et minute pellucido-punctulati, usque ad 14 cm longi et 6 cm lati. Petioli usque ad limbi latus longius 9 mm, inter limbi latera 1 mm longi. Pedunculi 10 mm longi. Spica in sicco fuscescens, 20 mm longa, 6 mm crassa. Bracteae pelta fere 0.75 mm diametro.

Luzon, Province of Laguna, Mount Banajao, *Bur. Sci. 6069 Robinson*, March.

62. **Piper parcirameum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 777.
MINDANAO, District of Davao, Todaya (Mount Calelan), *Elmer 11274*.

63. **Piper crassinodum** C. DC. l. c. 776.
LUZON, Province of Tayabas, Lucban, *Elmer 7626, 8042*.

64. **Piper parcipilum** C. DC. sp. nov.

Foliis breviter petiolatis, ovato-oblongis basi fere aequilatera obtusis, apice sat longe acuminatis acumine obtuso, utrinque parce hirtellis et adultis fere glabris, 5-plinerviis, nervo centrali fere 6 mm supra basin trifido sursumque nervulos validos et patulos mittente, nervo laterali adscendente utrinque a basi soluto; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro petiolum multo superante et tenui; spica quam folii limbus pluries breviore apice acuta, rhachi hirsuta, bractea glabra rotunda centro subsessili, staminibus 2, antheris ovatis filamenta longitudine aequantibus.

Dioicum. Ramuli glabri, spiciferi 1 mm crassi, collenchyma subcontinuum partim libriforme, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis alii peripherici, cellulae sclerosae interfasciculares cum phloemate fasciculorum periphericorum continuae. Limbi in sicco membranacei minute et inconspicue pellucido-punctulati, usque ad 11.75 cm longi et ad 34 mm lati. Petioli 6–10 mm, pedunculi 15 mm longi. Spicae circiter 12 mm longae. Bracteae 0.75 mm diametro.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, October.

65. **Piper Robinsonii** C. DC. sp. nov.

Foliis modice petiolatis elliptico-lanceolatis basi ima aequilatera acutis apice acute et sat longe acuminatis, utrinque crispule pubescentibus, 5-plinerviis, nervis adscendentibus, nervo centrali a 4 mm supra basin trifido, nervo laterali utrinque a basi soluto; petiolo pubescente basi ima vaginante; stirpis fem. pedunculo petiolum subaequante, supra in margine crispule pubescente, spica adhuc juvenili quam folii limbus pluries breviore, rhachi pilosa, bracteae glabrae pelta rotunda, ovario libero glabro.

Dioicum. Ramuli juniores crispule pubescentes, postea glabri, spiciferi 1 mm crassi, longitudinaliter striati, collenchyma in fasciculos discretos dispositum et haud libriforme, canalis lysigenis unicus centralis. Limbi in sicco membranacei creberrime et minute pellucido-punctulati, usque ad 5.5 cm longi et 20 mm lati. Petioli 5 mm longi. Spica juvenilis in specimine viso usque ad 6 mm longa et 1.5 mm crassa.

LUZON, Province of Laguna, Mount Banajao, *Bur. Sci. 6065 Robinson*, March.

66. **Piper ovatibaccum** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 778.

Foliis breviter petiolatis, ovato- vel elliptico-lanceolatis, basi leviter inaequilatera in mare utrinque acutis, in femina utrinque acutis vel altero latere rotundatis, apice acute et sat longe acuminatis, supra

subtusque haud dense pilosis, 7-plinerviis, nervo centrali a 5–10 mm supra basin trifido, nervis lateralibus adscendentibus utrinque 2 a basi solutis; petiolo dense piloso paullo ultra basin vaginante; stirpis masc. pedunculo glabro quam petiolus paullo breviore, spica florente limbi dimidium fere aequante, rhachi dense pilosa, bracteae glabrae pelta rotunda centro subsessili; staminibus 2 antheris ovato-globosis; stirpis fem. pedunculo rhachi et bractea ut in mare, ovario libero ovato glabro, stigmatibus 3 ovato-acutis, bacca ovata apice subacuta.

Dioicum, scandens. Ramuli primum dense villosi dein glabri et lenticellis concoloribus asperulati, spiciferi 1.5 mm crassi, collenchyma haud libriforme, in fasciculos discretos dispositum vel subcontinuum, fasciculi intramedullares 1-seriati, canales lysigenes peripherici nulli. Limbi in sicco membranacei creberrime et minute pellucido-punctulati, 9.5–10 cm longi, 3.5–4.5 cm lati. Petioli 7–8 mm, pedunculi circiter 5 mm longi. Spica masc. fere 4.5 cm longa et 1.5 mm crassa, fem. 1.5–2 cm longa et 6–8 mm crassa. Bracteae pelta fere 0.75 mm diametro. Bacca fere 2 mm longa, in sicco fuscescens.

Luzon, Province of Laguna, Mount Banajao, *For. Bur. 8016 Curran & Merritt*, fem., November, *Bur. Sci. 2460 Foxworthy*, masc., March, *Bur. Sci. 6089 Robinson* March: Province of Tayabas, Infanta, *Bur. Sci. 9355 Robinson*, fem., in the mossy forest, fruit red; Lucban, *Elmer 7888*, masc., *9335* fem., *Whitford 1004*, October. Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, masc. & fem.

Forma **b**.

Ramulis junioribus parce pilosis, cito glabratis, collenchyma subcontinuum haud libriforme.

Mindoro, Mount Halcon, *Merrill 5645*, November.

67. **Piper Toppingii** C. DC. in Elm. Leafl. Philip. Bot. 3 (1910) 779.

Foliis brevissime petiolatis, ovato-lanceolatis basi ima leviter inaequilatera altero latere attenuatis altero anguste rotundatis vel utrinque rotundatis, apice longe et obtusiuscule acuminatis, junioribus supra praesertim ad nervum centralem hirtellis dein glabris subtus ubique et sat dense hirsutis, nervo centrali nervos 2 adscendentes utrinque alternatim mittente, quorum superus a 2 cm supra basin solutus, nervis lateralibus altero latere 2 vel 3, altero 3 vel 4 a basi solutis, quorum superi adscendentes alii magis arcuati et breviores; petiolo dense hirsuto; stirpis masc. pedunculo hirsuto petiolum pluries superante, spica florente quam folii limbus fere triplo breviore, rhachi dense hirsuta, bracteae pelta glabra glandulis farcta et in sicco supra pulverulenti-albicante, staminibus 2, filamentis latis et brevibus, antheris secundum rhachin oblongo-ellipticis; stirpis fem. pedunculo et rhachi ut in mare, bracteae pelta ut in mare pedicello longo et hirsuto, ovario libero rotundato glabro, stigmate minuto 3-lobulato, baccis subtrigono-obovatis condensis.

Dioicum, scandens. Ramuli in sicco albido-villosi pilis 2 mm longis, spiciferi 2 mm crassi, collenchyma libriforme in fasciculos a latere valde

elongatos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco rigidi pellucido-punctulati et in femina punctis albidis conspersi, usque ad 13 cm longi et 4 cm lati. Petioli 3–5 mm longi, pedunculi in mare 25 mm in femina 40 mm longi. Spica in mare 4.5 cm longa, 2.5 mm crassa, in femina 7 cm longa, 5 mm crassa. Bracteae pelta 0.75 mm diametro. Ovarium pellucido-glandulosum. Bacca 1.5 mm longa.

LUZON, Province of Benguet, Baguio, *Topping 14*, January, *For. Bur. 5081 Curran*, August, *Williams 1091*, June; Trinidad River, *Bur. Sci. 5555 Ramos*, December, *Elmer 8375, 5850*, fem.; Mount Pulog, *Merrill 6530*, masc., May.

68. **Piper obovatibracteum** C. DC. in Elm. Leafl. Philip. Bot. **3** (1910) 780.
LUZON, Province of Tayabas, Lucban, *Elmer 7927*, May.

69. **Piper Mearnsii** C. DC. sp. nov.

Omnino glabrum, foliis breviter petiolatis, ovatis basi ima aequilatera acutis, apice subacute et sat longe acuminatis, 5-plinerviis nervo centrali fere a 7 mm supra basin nervum adscendentem opposite aut subopposite mittente, nervo laterali adscendente utrinque a basi soluto; petiolo basi ima vaginante pedunculo eum aequante, spica quam folii limbus pluries breviore, cylindrica, bracteae pelta elliptica centro brevissime pedicellata, staminibus 2 antheris globosis quam filamenta multo brevioribus, ovario libero ovato, stigmatibus 4 linearibus.

Frutex scandens. Ramuli spiciferi 2 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei crebre pellucido-punctulati, 8.5 cm longi, 47 mm lati. Bracteae pelta 1 mm lata.

LUZON, Province of Tayabas, Casiguran, *Bur. Sci. 2987 Mearns*, June.

70. **Piper Copelandii** C. DC. sp. nov.

Foliis modice petiolatis, elliptico-lanceolatis basi aequilatera acutis, apice longe et acute acuminatis, supra subtusque glabris, 7-plinerviis nervo centrali nervos adscendentes utrinque 2 opposite mittente, quorum supremi fere a 3 cm inferi paullo supra basin soluti, nervo laterali adscendente utrinque a basi soluto; petiolo glabro basi ima vaginante; pedunculo glabro petiolum paullo superante, spica quam folii limbus pluries breviore, cylindrica apice obtusa, rhachi hirsuta, bracteae pelta orbiculari glabra centro pedicellata pedicello hirsuto, flore hermaphrodito, staminibus 2?, antheris ellipticis filamenta fere aequantibus, connectivo producto apiculatis, ovario inferne in rhachi immerso et cum ea concreto superne libero conico glabro, stigmatibus 2 lateralibus lunulatis carnosis.

Frutex in arboribus scandens. Ramuli glabri, spiciferi 1.75 mm crassi, collenchyma in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis, alii peripherici. Limbi in sicco membranacei crebre pellucido-

punctulati, usque ad 12 cm longi et 5.5 cm lati. Petioli 7 mm, pedunculi 12 mm longi. Spica florens 1 cm longa et 5 mm crassa.

MINDANAO, District of Davao, Todaya, *Copeland 1298*, altitude about 1,200 m, April.

71. **Piper interruptum** Opiz in Reliq. Haenk. 1 (1828) 157.

P. Cumingianum Miq. Syst. Pip. (1843) 329; C. DC. Prodr. 16[1] (1869) 366, emend.

Foliis modice petiolatis, elliptico-lanceolatis basi leviter inaequilatera acutis, apice acute acuminatis, utrinque glabris, 5-nerviis; petiolo glabro basi vaginante; stirpis masc. pedunculo glabro petiolum fere aequante, spica adulta quam folii limbus longiore, rhachi parce pilosa, bractea longe adnata glabra oblonga utrinque obtusa, staminibus 3, filamento cum anthera aequilato et ea paullo longiore; stirpis fem. pedunculo glabro adulto petiolum fere triplo superante, spica folii limbum superante, rhachi et bractea ut in mare, ovario libero glabro, stigmatibus 3, obtusis, bacca libera ovata, glabra.

Dioicum, scandens. Ramuli glabri laeves, spiciferi 1.5 mm crassi, collenchyma in fasciculos discretos a latere productos dispositum et zona interna libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco firmulo-membranacei opaci, 7–9.5 cm longi, 4–6 cm lati. Petioli 1–1.5 cm longi. Spicae masc. 14 cm longae, 1 mm crassae, fem. paullo brevior.

LUZON, Province of Sorsogon, Sorsogon, *Haenke:* Province of Ilocos Norte, *Cuming 1190*, masc.: Province of Bataan, Lamao River, *Williams 16*, October. MINDANAO, Province of Misamis, *Cuming 1624*, fem.: District of Davao, Malita, *Copeland 676*, March.

Forma **b.**

Alte scandens, limbis usque ad 12 cm longis et 5.5 cm latis, pedunculis 35 mm longis.

LUZON, Province of Bataan, Lamao River, *Whitford 1040*, fem., altitude about 100 m, June.

β. **herbaceum** C. DC. var. nov.

Herba 50 cm alta, limbis usque ad 10.5 cm longis et 5 cm latis, baccis ellipticis, 4 mm longis, inferis in specimine viso brevissime stipitatis, stigmatibus 3 oblongis apice acutis.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3182*, fem., rare, on exposed ridges at an altitude of about 1,150 m, October.

γ. **multiplinerve** C. DC. var. nov.

Scandens, limbis 10.5 cm longis, 4.5 cm latis, in sicco pellucido-punctulatis, 5-plinerviis nervo centrali a 4 mm supra basin trifido, 10–11 cm longis, 4–6 cm latis, pedunculo petiolum duplo superante, 7 mm longo,

rhachi in mare glabra in femina parce pilosa, staminibus 3 antheris reniformibus, stigmatibus 4, ovato-acutis, bacca globosa.

LUZON, Province of Tayabas, Lucban, *Elmer 7691*, May, low, scandent, in light woods, altitude 750 m, the brown bark roughened with darker brown lenticels: Province of Rizal, Bosoboso, *Bur. Sci. 1019 Ramos*, June; Montalban, *Loher 4570, 4578:* Province of Bataan, Mount Mariveles, *Elmer 6855*, November: Province of Benguet, *For. Bur. 15865 Bacani*, December.

δ. **subarborescens** C. DC. var. nov.

Arbuscula, limbis 17 cm longis, 7.5 cm latis, 5-plinerviis, nervo centrali paullulo supra basin trifido; pedunculo petiolum fere duplo superante; spica fem. folii dimidium fere aequante, rhachi pilosa, stigmatibus 3, ovato-oblongis, apice acutis, bacca globosa.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 4585 Ramos*, a small shrub in forests, August.

72. **Piper ellipticibaccum** C. DC. sp. nov.

Foliis modice petiolatis, inferis ? anguste ovato-lanceolatis basi ima aequilatera acutis superne longe attenuatis et apice acutis, utrinque glabris, 5-nerviis; petiolo glabro ultra basin vaginante; stirpis fem. pedunculo glabro petiolum fere aequante, spica quam folii limbus breviore, rhachi hirtella, bractea longe adnata, glabra obovato-oblonga, ovario libero, glabro, stigmatibus 3 vel 4, linearibus acutis, bacca elliptica.

Dioicum, scandens. Ramuli glabri 2 mm crassi, in sicco flavicantes, teretes, collenchyma subcontinuum fere omnino libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco subrigidi, minute et haud crebre pellucido-punctulati, usque ad 11.5 cm longi et ad 2.5 cm lati. Petioli usque ad 10 mm longi. Folia speciminis visi verisimiliter tantum plantae folia infera. Spica baccifera in specimine unica et segregata, 6.5 cm longa. Bractea 2.5 mm longa et apice fere 1.5 mm lata. Bacca 4 mm longa et fere 2.5 mm crassa, in sicco atrorubescens.

LUZON, Province of Camarines, Maagnas, *Bur. Sci. 6344 Robinson*, August.

73. **Piper Clemensiae** C. DC. sp. nov.

Omnino glabrum, foliis modice petiolatis, subrotundato-ovatis basi aequilatera rotundatis, apice acute acuminatis, 7-nerviis; petiolo basi ima vaginante; stirpis fem. pedunculo petiolum superante, spica matura folii limbum duplo et plus superante, bractea longe adnata oblonga utrinque obtusa, ovario libero ovato, stigmatibus 3 ovatis carnosis, bacca ovata apice mucronulata.

Dioicum. Ramuli spiciferi usque ad 3 mm crassi, collenchyma in fasciculos discretos dispositum, zona interna libriforme vel haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis, epidermidis parietes externae crassae. Limbi in sicco firmi, virescentes,

pellucido-punctulati, superi 11 cm longi et 6.5 cm lati, inferiores magis rotundati et basi cordati. Petioli 1.5 cm pedunculi usque ad 3 cm longi. Spicae bacciferae 22 cm longae. Bractea 5 mm longa. Bacca 6 mm longa, 3 mm crassa, in sicco fuscescens.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1200,* January.

74. **Piper Loheri** C. DC. sp. nov.

Foliis modice petiolatis, ovato-lanceolatis basi levissime inaequilatera acutis apice acute acuminatis, utrinque glabris, 7-nerviis nervis adscendentibus; petiolo glabro basi ima vaginante; stirpis masc. pedunculo glabro quam petiolus paullo breviore, spica subflorente folii limbum aequante, filiformi, rhachi parce pilosa, bractea longe adnata oblongo-elliptica, staminibus 2 filamentis brevissimis antheras latitudine aequantibus; stirpis fem. pedunculo glabro petiolum aequante, spica matura limbum subaequante, rhachi et bractea ut in mare, ovario libero glabro, stigmatibus 4 ovato-acutis, bacca ovata vel oblonga-ovata.

Dioicum, scandens. Ramuli glabri, spiciferi 1 mm crassi, collenchyma partim libriforme in fasciculos discretos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei creberrime et minute pellucido-punctulati, 9–10 cm longi, 4.5–6 cm lati. Petioli usque ad 2 cm longi. Bractea 2.5 mm longa, 1 mm lata. Bacca in sicco 4 mm longa et fuscescens.

LUZON, Province of Rizal, Mountains of San Mateo, *Loher 4553,* masc.; San Francisco, *Loher 4578, 4579, 4581;* Montalban, *Merrill 5039,* March: Province of Pangasinan, *Alberto 40:* Province of Nueva Ecija, *For. Bur. 8495 Curran,* January: Province of Laguna, *Hallier,* December: Province of Union, Bauang, *Elmer 5738,* February.

Forma **b.**

Scandens, limbis superis usque ad 12 cm longis et 6.5 cm latis.

LUZON, Province of Batangas, Santo Tomás, *Milaor 278,* January; a vine in dry places.

β **multiplinerve** C. DC. var. nov.

Scandens, limbis usque ad 11 cm longis et 5 cm latis, 5-plinerviis, nervo centrali nervos adscendentes utrinque 2 mittente, quorum supremus fere a 1 cm supra basin solutus, stirpis fem. spica usque ad 13 cm longa, bacca globosa in sicco 3 mm crassa et fuscescens.

LUZON, Province of Bataan, Lamao, *Bur. Sci. 1870 Foxworthy,* December: Province of Laguna, Lilio, *Bur. Sci. 6015 Robinson,* March.

75. **Piper laevirameum** C. DC. sp. nov.

Foliis modice petiolatis, ovato-ellipticis ima basi leviter inaequilatera subacutis vel brevissime subpeltatis apice acute acuminatis, utrinque glabris, 7-nerviis, nervis adscendentibus; petiolo glabro basi ima vaginante; stirpis fem. pedunculo glabro tenui petiolum superante; spica submatura folii limbum superante, rhachi pilosa; bractea glabra longe

adnata, oblonga inferne attenuato-acuta apice truncata, ovario libero glabro, stigmatibus 3 ovato-acutis, bacca submatura ovata.

Dioicum. Ramuli glabi, laeves, spiciferi 2 mm crassi, collenchyma libriforme in fasciculos a latere productos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco firmo-membranacei creberrime pellucido-punctulati, 16 cm longi, 8.5 cm lati. Petioli usque ad limbi latus longius 2 cm inter limbi latera 1 mm longi. Pedunculi 32 mm longi, 1 mm crassi. Spica submatura 19 cm longa. Bractea 3.5 mm longa 1 mm lata. Bacca 3.5 mm longa, in sicco nigra.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1255*, September, October.

76. Piper abraense C. DC. nov.

Foliis breviter petiolatis, ovato-ellipticis basi ima aequilatera subacutis, apice acute et sat longe acuminatis, utrinque glabris, 7-nerviis vel 7-plinerviis et tum nervo centrali paullulo supra basin trifido, nervis lateralibus extremis tenuibus; petiolo glabro basi ima vaginante; stirpis fem. pedunculo glabro petiolum adultum fere aequante, spica matura quam folii limbus breviore, rhachi hirsuta, bractea longe adnata, glabra elliptico-oblonga utrinque rotundata, ovario libero glabro, stigmatibus 4 ovato-acutis, bacca ovato-globosa.

Arbuscula 1 mm alta, dioica. Ramuli teretes glabri, laeves, in sicco pallide virescentes, spiciferi 1 mm crassi, collenchyma partim libriforme in fasciculos a latere valde productos dispositum seu subcontinuum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis, cellulae sclerosae interfasciculares cum phloemate fasciculorum perifericorum continuae. Limbi in sicco membranacei minute pellucido-punctulati, usque ad 10.5 cm longi et ad 5.5 cm lati; limbi inferi ovato-acuminati, basi aequilatera rotundati. Petioli superi usque ad 10 mm inferi usque ad 16 mm longi. Spica circiter 5.5 cm longa. Bractea 3 mm longa, 1.5 mm lata. Bacca 3 mm longa, fere 2.75 mm crassa, in vivo rubra, in sicco atrorubescens.

LUZON, Province of Abra, Bur. Sci. *7195 Ramos*, January.

77. Piper glabrispicum C. DC. in Perkins Frag. Fl. Philip. (1905) 155, emend.

Omnino glabrum, foliis breviter petiolatis, ovato-ellipticis, basi leviter inaequilatera acutis, apice breviter et acute acuminatis, 7-plinerviis, nervo centrali nervos adscendentes 2 alternatim mittente quorum supremus fere a 1 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis quorum extremi aliis multo tenuiores; petiolo basi ima vaginante; stirpis fem. pedunculo petiolum paullo superante, spica limbum aequante vel eum paullo superante, bractea longe adnata oblonga utrinque obtusa, ovario libero ovato, stigmatibus 3 ovato-acutis.

Dioicum. Ramuli in sicco subcinerescentes, spiciferi 1 mm crassi, collenchyma continuum libriforme, fasciculi intramedullares 1-seriati,

canalis lysigenis centralis canalesque peripherici plures. Limbi in sicco membranacei creberrime pellucido-punctulati, 10–11 cm longi, 4–4.5 cm lati. Petioli fere 11 mm, pedunculi 15 mm longi. Bractea 4 mm longa, 1 mm lata. Species P. nigro proxima, an hujus forma spontanea?

MINDANAO, District of Davao, Taumo, *Warburg 14748*.

78. **Piper nigrum** Linn. Sp. Pl. (1753) 28.
Piper laxum Vahl Enum. 1 (1804) 326.
PHILIPPINES, Vahl in herb. et l. c.; cultivated in all the tropical countries of the old world, and also in Brazil and in the West Indies.

β **trioicum** C. DC. Prodr. 16[1] (1869) 363, emend.

Foliis modice petiolatis, ellipticis, basi utrinque aequilonga acutis, a nervo centrali inaequilatis, apice acute acuminatis, utrinque glabris, 7-plinerviis nervo centrali nervos adscendentes utrinque 2 alternatim mittente quorum supremus fere a 2 cm supra basin solutus, nervo laterali tenui aliis multo breviore utrinque a basi soluto; petiolo glabro fere usque ad medium vaginante, pedunculo glabro petiolum aequante, spica submatura quam folii limbus fere dimidio breviore, rhachi hirsuta, bractea longe adnata glabra oblongo-obovata basi obtusa apice rotundata et florem semiamplectente, flore hermaphrodito; staminibus 2, antheris ovatis 4-valvatis vel incompletis, ovario libero glabro, stigmatibus 4 lanceolatis, bacca submatura globosa.

Trioicum, scandens, Ramuli glabri in sicco nigri, spiciferi 1.5 mm crassi, collenchyma libriforme in fasciculos discretos tenues a latere productos dispositum, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis alii peripherici. Limbi in sicco rigido-membranacei, opaci inconspicue et minute pellucido-punctulati, usque ad 11 cm longi et 5 cm lati. Petioli 1 cm longi. Spica 6 cm longa. Bractea fere 3 mm longa et apice 1.5 mm lata. Filamenta oblonga, antherae normales eis aequilatae ovatae et quadrivalvatae. Bacca in sicco nigra.

LUZON, Province of Cavite, Mendez Nuñez, *Bur. Sci. 1339 Mangubat*, August.

79. **Piper pilispicum** C. DC. sp. nov.

Foliis breviter petiolatis, oblongo-ovatis, basi aequilatera obtusis, apice acute acuminatis, utrinque glabris, 7-plinerviis nervo centrali a 2–3 mm supra basin trifido, nervis lateralibus adscendentibus utrinque 2 a basi solutis quorum extremi tenuissimi; petiolo glabro basi vaginante; stirpis fem. pedunculo glabro quam petiolus triplo longiore, spica matura limbo breviore, rhachi dense hirsuta, bractea longe adnata glabra oblonga utrinque rotundata ovario libero glabro stigmatibus 4 ovato-acutis, bacca ovata apice attenuato-subacuta.

Dioicum. Ramuli glabri teretes, in sicco fuscescentes, spiciferi 2 mm crassi; collenchyma libriforme, in fasciculos discretos tenues dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis.

Limbi in sicco rigidi crebre pellucido-punctulati usque ad 12.5 cm longi et ad 47 mm lati. Petioli 6 mm longi. Pedunculi usque ad 20 mm longi et 0.5 mm crassi. Spicae 7.5 cm longae. Bractea 2.5 mm longa et 1.5 mm lata. Bacca 4 mm longa et usque ad 3 mm crassa, in sicco atrorubens.

LUZON, Province of Benguet, *Bur. Sci. 5720 Ramos*, December.

Forma b.

Limbis in sicco magis membranaceis.

LUZON, Province of Ilocos Norte, Mount Piao, *For. Bur. 12484 Merritt & Darling*, November.

80. **Piper davaoense** C. DC. in Perk. Frag. Fl. Philip. (1905) 154, emend.

Foliis breviter petiolatis, ovatis basi ima leviter inaequilatera acutis apice acute acuminatis utrinque glabris, 7-plinerviis nervo centrali nervum adscendentem altero latere a 3–4 mm supra basin mittente, aliis nervis a basi solutis quorum ultimi caeteris tenuioribus et brevioribus; petiolo basi ima vaginante; stirpis fem. pedunculo glabro petiolum spicaque folium pluries superantibus; rhachi pilosa, bractea longe adnata, glabra, oblonga apice obtusa basi attenuata; bacca libera submatura ovata, stigmatibus 3 ovatis apice acutis.

Dioicum, scandens. Ramuli glabri in sicco pallide virescentes, spiciferi 1 mm crassi, collenchyma libriforme in fasciculos discretos a latere elongatos dispositum, fasciculi intramedullares 1-seriati, canales lysigenes peripherici nulli. Limbi in sicco membranacei crebre et conspicue pellucido-punctulati, usque ad 9 cm longi et ad 47 mm lati. Petioli 5 mm longi. Foliorum inferiorum limbi 7-nervii et basi aequilateri. Pedunculi 4.5 cm longi, spicae usque ad 30 cm longae. Bractea 5 mm longa, apice 1 mm lata.

MINDANAO, District of Davao, Mount Dagatpan, in mixed forests, *Warburg 14740;* Taumo, *Warburg 14745;* Barakatan Creek, in dry woods, altitude about 540 m, scandent on small trees and forming loose hanging bunches, the inflorescence hanging in a twining and curving manner, *Elmer 11065*, locally known as *manikatapoe* (Bagobo).

81. **Piper pulogense** C. DC. sp. nov.

Foliis modice petiolatis, ovato-ellipticis, basi ima levissime inaequilatera subacutis apice acute et sat longe acuminatis, utrinque glabris, 5-nerviis; petiolo glabro ultra medium vaginante; stirpis fem. pedunculo glabro petiolum fere duplo superante, spica folii limbum paullo superante, rhachi glabra, bractea obovato-elliptica lata, rhachi late adnata, ovario libero ovato glabro, stigmatibus 3 vel 4 rotundatis, bacca oblonga basi brevissime stipitata.

Dioicum, scandens. Ramuli glabri in sicco fusco-nigri, spiciferi 2 mm crassi, collenchyma libriforme in fasciculos discretos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei minute pellucido-punctulati, usque ad 8.5 longi et ad

4.5 cm lati. Petioli 1.5 cm, pedunculi 3 cm longi. Bractea membranacea 3 mm longa 2 mm lata. Stigmata in apice ovarii sessilia. Bacca 4.5 mm longa, 3 mm crassa, ejus stipes 0.5 mm crassus.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16240 Curran, Merritt, & Zschokke,* January.

82. **Piper apoanum** C. DC. in Elm. Leafl. Philip. Bot. **3** (1910) 781.
MINDANAO, District of Davao, Todaya (Mount Apo), *Elmer 11174.*

83. **Piper negrosense** C. DC. l. c. 782.

Foliis breviter petiolatis, anguste ovato-oblongis, basi levissime inaequilatera obtusis, superne longe attenuatis et summo apice obtusiusculis, utrinque glabris vel subtus ad nervum centralem parcissime hirtellis, 5-plinerviis, nervo centrali nervos 2 adscendentes opposite vel subopposite mittente quorum supremus a 5–8 mm supra basin solutus, nervo laterali adscendente utrinque a basi soluto; petiolo dense hirtello basi ima vaginante; stirpis masc. pedunculo hirtello petiolum fere triplo superante; spica florente quam folii limbus pluries breviore, cylindrica apice attenuata, rhachi dense hirsuta, bracteae pelta rotunda carnosa margine ciliolata, centro pedicellata pedicello hirsuto, staminibus 2 antheris rotundatis quam filamenta multo brevioribus; stirpis fem. pedunculo petiolum fere duplo superante, spica matura quam folii limbus pluries breviore, rhachi hirsuta, bractea ut in mare sed paullo minore, ovario libero glabro, stigmatibus 4 ovato-acutis, bacca ovato-globosa stipitem suum superante.

Dioicum, scandens. Ramuli teretes laeves, juniores puberuli cito glabri, spiciferi 1 mm crassi, collenchyma libriforme in fasciculos discretos tenues dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei minute pellucido-punctulati, usque ad 11 cm longi et ad 18 mm lati, inferi ovato-acuminati basi aequilatera cordati usque ad 7 cm longi et ad 37 mm lati. Petioli superi usque ad limbi latus longius 5 mm, inter limbi latera vix 1 mm longi. Pedunculi in mare 20 mm, in femina 12 mm longi. Spica masc. 20 mm longa, 2 mm crassa, fem. circiter 15 mm longa. Bracteae pelta in mare 1.5 mm, in fem. 1 mm diametro. Bacca 5 mm longa 4 mm crassa.

NEGROS, Dumaguete, Cuernos Mountains, *Elmer 9482,* masc., March. POLILLO, eastern base of Mount Malulud, altitude about 50 m, fruit dull-red, *Bur. Sci. 9213 Robinson,* fem., August.

84. **Piper densibaccum** C. DC. sp. nov.

Foliis breviter petiolatis, oblongis, basi aequilatera obtusis acutisve, apice sat longe acuminatis, acumine obtuso; petiolo excepto puberulo utrinque glabris, 5-plinerviis nervo centrali ab 1–1.5 cm supra basin trifido, nervo laterali utrinque a basi soluto; petiolo basi vaginante; pedunculo glabro petiolum multo superante; stirpis fem. spica quam

limbi dimidium paullo breviore dense baccifera, rhachi hirsuta, bracteae pelta rotunda glabra pedicello brevi crasso et hirsuto, ovario libero ovato-oblongo, stigmatibus 4 vel 5, ovato-acutis, bacca subglobosa stipitem suum paullo superante.

Dioicum, scandens. Ramuli glabri, spiciferi 1 mm crassi, collenchyma libriforme continuum zonam tenuissimam formans, fasciculi intramedullares 1-seriati, canalis lysigenis centralis canalesque peripherici. Limbi in sicco firmo-membranacei minute et inconspicue pellucido-punctulati, 10.5 cm longi, 3.5–4 cm lati. Petioli usque ad 7 mm longi. Stigmata sessilia. Bacca 3 mm longa in sicco nigra.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, March.

85. Piper dipterocarpinum C. DC. sp. nov.

Foliis breviter petiolatis, elliptico-lanceolatis, inferne attenuatis et basi aequilatera acutis, apice longe et acute acuminatis, utrinque glabris, 5-plinerviis, nervo centrali fere a 8 mm supra basin trifido, nervo laterali adscendente utrinque a basi soluto; petiolo basi ima vaginante pedunculoque eum multo superante tenuibus et glabris; stirpis fem. spica quam folii limbus pluries breviore, rhachi dense hirsuta, bracteae glabrae pelta rotunda centro subsessili, ovario libero glabro, stigmatibus 4 vel 5 linearibus acutis, bacca immatura elliptica stipitem suum aequante.

Dioicum, scandens. Ramuli glabri, spiciferi 1.5 cm crassi, collenchyma libriforme zonam tenuem formans, fasciculi intramedullares 1-seriati, canalis lysigenis centralis, canales peripherici rari. Limbi in sicco membranacei minute pellucido-punctulati, superi usque ad 12 cm longi et 3.5 cm lati, inferi ovati basi et apice ut superi usque ad 16 cm longi et 7.5 cm lati. Petioli 5 mm, pedunculi 12 mm longi. Spicae 3 cm longae. Bracteae pelta 0.75 mm diametro.

MINDANAO, District of Zamboanga, near Port Banga, *For. Bur. 9146 Whitford*, January, in dipterocarp forests, altitude about 20 m.

86. Piper dagatpanum C. DC. in Perk. Frag. Fl. Philip. (1905) 154, emend.

Foliis modice petiolatis, ovatis vel oblongo-ovatis, basi leviter inaequilatera rotundatis vel subrotundatis, apice modice et acute acuminatis, utrinque glabris, 9-ninerviis, nervo centrali nervos adscendentes utrinque 2 mittente quorum supremus fere a 2 cm supra basin solutus, nervis lateralibus 2 utrinque a basi solutis; petiolo glabro fere usque ad medium vaginante; stirpis fem. pedunculo glabro petiolum sat superante, spica quam folii limbus dimidio breviore, rhachi hirsuta, bractea glabra rotundato-obovata late sessili, ovario libero glabro, stigmatibus 4 linearibus, bacca subglobosa stipitem suum paullo superante.

Dioicum, scandens. Ramuli inferi sat longe pilosi, superi glabri, laeves, cylindrici, spiciferi 1.5 mm crassi, collenchyma continuum, sparsim et parce libriforme, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis alii peripherici. Limbi in sicco mem-

branacei crebre pellucido-punctulati, ovati, usque ad 13 cm longi et ad 7.5 cm lati, vel oblongo-ovati usque ad 11.5 cm longi et 5 cm lati. Petioli 10–15 mm longi. Pedunculi in sicco tenuissimi, 25 mm longi. Bractea in sicco membranacea 1 mm paullulo longior et superne 1 mm lata. Bacca fere 4 mm longa.

MINDANAO, District of Davao, Mount Dagatpan, *Warburg 14739;* Sibulan River, *Warburg 14738.*

87. **Piper paucinerve** C. DC. in Perk. Frag. Fl. Philip. (1905) 156, emend.

Foliis modice petiolatis, elliptico-lanceolatis inferne attenuatis et basi aequilatera acutis apice longe et acute acuminatis, 5-plinerviis, nervo centrali fere a 1 cm supra basin trifido, nervo laterali adscendente utrinque a basi soluto; petiolo basi ima vaginante pedunculoque eum paullo superante glabris; stirpis fem. spica quam folii limbus triplo breviore, rhachi dense hirtella, bracteae glabrae pelta transverse elliptica fere centro brevissime pedicellata, ovario elliptico minutissime puberulo stigmatibus 4 ovato-acutis, bacca glabra globoso-elliptica stipitem suum superante.

Dioicum. Ramuli glabri, spiciferi 1 mm crassi, laeves in sicco fuscescentes, vetustiores albicantes et rugosi, zona peridermatis subepidermidalis sat crassa, collenchyma libriforme in fasciculos tenues a latere elongatos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis, cellulae sclerosae interfasciculares cum phloemate fasciculorum periphericorum continuae. Limbi in sicco membranacei parce pellucido-punctulati, 9–10.5 cm longi, 3–3.5 cm lati. Petioli circiter 12 mm longi. Bacca fere 4 mm longa.

LUZON, Province of Isabela, Malunu, *Warburg 11929.*

88. **Piper tenuirameum** C. DC. in Perkins Frag. Fl. Philip. (1905) 159, emend.

Foliis breviter petiolatis, ovato-oblongis, basi aequilatera cordatis, apice longe et obtusiuscule acuminatis, utrinque nervo centrali excepto supra puberulo glabris, 5-plinerviis nervo centrali a 5 mm supra basin trifido, nervo laterali utrinque a basi soluto; petiolo hirtello fere usque ad medium vaginante; stirpis fem. pedunculo hirtello petiolum duplo superante, spica matura quam folii limbus pluries breviore, rhachi hirsuta, bracteae pelta rotunda margine ciliata pedicello hirsuto claviformi, ovario libero ovato glabro, stigmatibus 3 vel 4 ovato-oblongis apice acutis, bacca ovato-globosa stipitem suum paullo superante.

Dioicum, scandens. Ramuli juniores puberuli, spiciferi 1.5 mm crassi, collenchyma subcontinuum zona interna interrupte libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei minute pellucido-punctulati, usque ad 12 cm longi et ad 4 cm lati. Petioli fere 1 cm longi. Spica baccifera fere

2 cm longa. Bracteae pelta 1 mm diametro. Bacca 5 mm longa glabra. Planta in sicco aromatica.

LUZON, Province of Rizal, Binangonan, *Warburg 13317*.

89. **Piper marivelesanum** C. DC. in Perk. Frag. Fl. Philip. (1905) 155, emend.

Foliis modice petiolatis, oblongo-ovatis, superis basi subaequilatera cordulatis obtusisve, apice sat longe acuminatis, junioribus supra ad nervum centralem subtus ad nervos omnes vel ubique parce hirtellis, dein glabris, 5–7-plinerviis, nervo centrali nervos 2 adscendentes subopposite mittente quorum supremus a 1 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 1 vel 2 a basi solutis; petiolo basi ima vaginante pedunculoque eum multo superante subdense hirtellis, spica quam folii limbus pluries breviore, bracteae pelta glabra rotunda centro pedicellata pedicello rhachique hirsutis; ovario glabro libero stigmatibus 4 linearibus, bacca matura globosa glabra, stipitem suum glabrum paullo superante.

Dioicum, scandens. Ramuli juniores hirtelli, spiciferi vix 2 mm crassi, collenchyma subcontinuum zona interna libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis unicus centralis. Limbi in sicco membranacei crebre et minute pellucido-punctulati, superi usque ad 11.5 cm longi et 4 cm lati. Petioli usque ad 8 mm, pedunculi usque ad 20 mm longi. Spicae usque ad 4 cm longae. Bracteae pelta circiter 0.75 mm diametro. Bacca usque ad 4 mm longa.

LUZON, Province of Bataan, Mariveles, *Warburg 13640;* Lamao River, Mount Mariveles, *Merrill 3727, 3786,* altitude 600 to 1,000 m, *For. Bur. 2507 Meyer, For. Bur. 1756 Borden, Williams 369, 370, Whitford 1060, For. Bur. 165 Barnes:* Dinalupijan, *Merrill 1579:* Province of Benguet, Sablan, *Elmer 6161:* Province of Rizal, Bosoboso, *Bur. Sci. 1115 Ramos:* Province of Tayabas, Lucban, *Elmer 9330:* Province of Camarines, Maagnas, *Bur. Sci. 6327 Robinson.* MINDORO, Bongabong River, *For. Bur. 3668 Merritt.* MINDANAO, District of Davao, Davao, *Copeland 501.*

90. **Piper basilanum** C. DC. sp. nov.

Foliis breviter petiolatis, ovatis, basi aequilatera rotundatis, apice obtusiuscule et sat longe attenuatis, supra in nervo centrali basi parce hirtellis subtus ubique hirsutis, 5-plinerviis, nervo centrali a 5–8 mm supra basin trifido, nervo laterali adscendente utrinque a basi soluto; petiolo hirtello basi ima vaginante; stirpis fem. pedunculo glabro petiolum multo superante, spica quam folii limbus triplo breviore, rhachi hirsuta, bracteae pelta glabra rotunda pedicello hirsuto brevi et crasso, ovario libero ovato glabro, stigmatibus 3 ovatis brevibus, bacca submatura stipitem suum superante.

Dioicum, scandens. Ramuli glabri, spiciferi fere 1.5 mm crassi, collenchyma continuum haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis centralis et canales peripherici. Limbi in sicco membranacei sparsim pellucido-punctulati, superi usque ad 10.5 cm longi et

ad 52 mm lati, inferi basi haud profunde cordati. Petioli superi fere 5 mm, inferi 15 mm longi. Pedunculi 20 mm longi. Bracteae pelta 0.75 mm diametro.

Basilan, *Hallier*, January.

91. **Piper Hallieri** C. DC. sp. nov.

Foliis modice petiolatis, elliptico-lanceolatis, basi aequilatera acutis, apice acute acuminatis, supra praesertim ad nervos et parce subtus ubique et sat dense breviter hirsutis, 7-plinerviis nervo centrali fere a 1 cm supra basin trifido, nervis lateralibus adscendentibus utrinque 2 a basi solutis quorum externi aliis tenuiores; petiolo breviter hirsuto fere usque ad medium vaginante; stirpis fem. pedunculo parce et breviter hirsuto petiolum adultum paullo superante, spica matura limbi dimidium subaequante, rhachi hirsuta, bracteae pelta glabra rotunda pedicello crasso sat longe et dense hirsuto, stigmatibus 4 linearibus, bacca libera glabra obovato-globosa stipitem suum aequante.

Dioicum. Ramuli breviter et haud dense hirsuti, spiciferi 1 mm crassi, collenchyma continuum zona interna interrupte libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis centralis, canalesque peripherici plures. Limbi in sicco membranacei parce pellucido-punctulati, fere usque ad 13.5 cm longi et 6 cm lati. Petioli usque ad 20 mm, pedunculi ad 25 mm longi. Bracteae pelta 1 mm diametro. Bacca 3 mm longa.

Basilan, *Hallier*, January.

92. **Piper caninum** A. Dietr. Sp. Pl. 1 (1831) 681; Miq. Comm. Phyt. (1839) 17, 33, *tab. 3;* C. DC. Prodr. 16[1] (1869) 341, emend.

Foliis breviter petiolatis, ovato-oblongis basi aequilatera attenuatis et acutis, apice acute acuminatis, supra glabris subtus sat dense pilosis 5-plinerviis, nervo centrali nervos adscendentes 2 alternatim vel subopposite mittente, quorum supremus a 1 cm supra basin solutus, nervo laterali adscendente utrinque a basi soluto, petiolo dense piloso basi ima vaginante; stirpis masc. pedunculo puberulo petiolum fere aequante, spica quam folii limbus pluries breviore, filiformi, rhachi hirsuta, bractea pelta rotunda pedicellata margine pedicelloque hirsutis, staminibus 2, filamentis emergentibus antheris globosis; stirpis fem. pedunculo petiolum fere aequante et hirtello, rhachi et bractea ut in mare, ovario libero glabro, stigmatibus 3 rarius 4 ovato-acutis, bacca ovato-globosa apice obtuse rostellata.

Dioicum, scandens. Ramuli juniores in mare breviter hirtelli in femina sat dense pilosi, spiciferi in mare 0.5 mm, in femina fere 1 mm crassi, collenchyma in fasciculos discretos dispositum zona interna vel totum libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis centralis et in femina canales peripherici 3. Limbi in sicco membranacei pellucido-punctulati, usque ad 11 cm longi et ad 4 cm lati. Petioli

usque ad 10 mm longi. Spicae masc. circiter 2 cm, fem. circiter 4.5 cm longae. Bractea pelta 0.5 mm diametro. Bacca in vivo 8 mm longae 6–7 mm latae, in sicco 5 mm longae, 3–4 mm latae.

Spontaneous and cultivated in the Malayan Peninsula and Archipelago.

Var. **glabribracteum** C. DC. var. nov.

Ramulis glabris, limbis ovato-lanceolatis basi aequilatera acutis apice longe et acute acuminatis 5-plinerviis, supra glabris subtus pilosis, 11.5 cm longis, 5.5 cm latis, pedunculo glabro petiolum paullo superante, bractea glabra obovato-rotunda, bacca in sicco 2.5 mm longa.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 176*, February.

Var. **sablanum** C. DC. var. nov.

Ramulis glabris, limbis ovatis basi aequilatera rotundatis apice longiuscule et acute acuminatis, supra glabris subtus haud dense pilosis, 7-plinerviis, circiter 12 cm longis et usque ad 7 cm latis, bractea glabra transverse elliptica, bacca in sicco 7 mm longa, 5 mm crassa.

LUZON, Province of Benguet, Sablan, *Elmer 6150*, April.

Var. **latibracteum** C. DC. var. nov.

Ramulis dense villosis, late ovatis basi aequilatera rotundatis apice longe et acute acuminatis, supra parce subtus densius pilosis, 7-plinerviis, 8.5 cm longis 5 cm latis, bracteae glabrae pelta rotunda 1.5 mm diametro.

LUZON, Province of Tayabas, Lucban, *Elmer 7627, 7990*, rare, 750 to 3,500 feet: Province of Benguet, Baguio, *Elmer 8844*.

Var. **lanaoense** C. DC. var. nov.

Ramulis haud dense vilosis, limbis elliptico-ovatis basi leviter inaequilatera altero latere rotundatis altero subacutis, apice acute acuminatis, supra parce subtus sat dense hirsutis, 7-plinerviis, usque ad 12 cm longis et ad 5 cm latis; bracteae glabrae pelta obovato-rotunda centro subsessili, 0.75 mm longa.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September.

93. **Piper acutibaccum** C. DC. sp. nov.

Foliis modice petiolatis, anguste elliptico-lanceolatis basi aequilatera cuneatis apice longe et acute acuminatis, supra glabris subtus ad nervum centralem parce pilosis, 5-plinerviis, nervo centrali nervos 2 adscendentes alternatim mittente quorum superus a 7 mm supra basin solutus, vel 5-nerviis nervis 3 centralibus inferne approximatis; petiolo piloso paullo ultra basin vaginante; stirpis fem. pedunculo glabro petiolum fere duplo superante; spica quam folii limbus breviore, rhachi hirsuta, bracteae glabrae pelta rotunda centro pedicellata, stigmatibus 3 linearibus brevibus; bacca glabra submatura fusiformi apice attenuato-acuta.

Dioicum, scandens. Ramuli pilosi, spiciferi 1 mm crassi, collenchyma continuum haud libriforme, fasciculi intramedullares 1-seriati, canalis

lysigenis unicus centralis. Limbi in sicco membranacei pellucido-punctulati, 10.5 cm longi, 3 cm lati. Petioli 7 mm, pedunculi 12 mm longi 1.5 mm crassi. Spica 7 cm longa, rhachis 1.5 mm crassa. Bracteae pelta 1.5 mm diametro. Bacca 6 mm longa, 3 mm crassa, ejus stipes 3 mm longus.

LUZON, Province of Laguna, Dahican, *Bur. Sci. 10031 Ramos*, July, on large trees in forests.

94. **Piper Merrittii** C. DC. sp. nov.

Foliis modice petiolatis, ovatis, basi leviter inaequilatera cordatis apice acute acuminatis, utrinque et subtus densius villosis, 7-plinerviis, nervo centrali nervos adscendentes 2 alternatim vel opposite mittente quorum supremus 1 cm supra basin solutus, nervis lateralibus adscendentibus utrinque 2 a basi solutis; petiolo dense villoso basi ima vaginante; stirpis fem. pedunculo villoso petiolum aequante vel paullo superante; spica limbi dimidium fere aequante, rhachi hirsuta, bractea glabra rotunda centro breviter pedicellata, ovario libero ovato glabro, stigmatibus 4 ovato-acuminatis apice subulatis; bacca globosa stipitem suum paullo superante.

Dioicum, scandens. Ramuli villosi, spiciferi 1.75 mm crassi, collenchyma libriforme in fasciculos a latere elongatos dispositum, fasciculi intramedullares 1-seriati, canalis lysigenis centralis aliique peripherici. Limbi in sicco membranacei minute pellucido-punctulati, superi fere 10.5 cm longi, 47 mm lati. Petioli 15 mm longi. Spicae fere usque ad 6 cm longae. Bracteae pelta sub 1 mm diametro. Bacca 3 mm diametro.

MINDORO, Balete, in forests, altitude about 30 m, *For. Bur. 6138 Merritt*, January.

Forma **b.**

Limbis basi leviter inaequilatera profundius cordatis, usque ad 7.5 cm latis, spicis brevioribus, bacca matura globoso-elliptica.

MINDANAO, District of Davao, Todaya (Mount Calelan), *Elmer 10581*, in most dense woods at 1,200 m altitude.

95. **Piper tenuipedunculum** C. DC. sp. nov.

Foliis modice petiolatis, ovatis basi aequilatera cordatis, apice acute et sat longe attenuato-acuminatis, basi supra ad nervos hirtellis subtus sat dense hirsutis, 9-ninerviis, nervo centrali nervos 2 adscendentes mittente quorum supremus a 1.5 cm supra basin solutus, nervis lateralibus utrinque 3 a basi solutis quorum externi tenuiores et minus adscendentes; petiolo dense hirsuto basi ima vaginante; stirpis fem. pedunculo tenui glabro petiolum multo superante, spica limbi dimidium subaequante, rhachi tenui hirsuta; bractea obovata glabra centro sessili, ovario libero ovato glabro, stigmatibus 3 vel 4 linearibus apice acutis, bacca submatura elliptica apice rotundata stipitem suum aequante.

Dioicum, scandens. Ramuli villosi, spiciferi 2 mm crassi, collenchyma

in fasciculos discretos dispositum et haud libriforme, fasciculi intramedullares 1-seriati, canalis lysigenis centralis, canales peripherici pauci, cellulae sclerosae interfasciculares cum phloemate fasciculorum perifericorum continuae. Limbi in sicco membranacei inconspicue pellucido-punctulati, 12 cm longi, 6 cm lati. Petioli 2 cm, pedunculi usque ad 5.5 cm longi et 0.5 mm crassi.

MINDANAO, District of Zamboanga, Sax River, *Williams 2343 p. p.*, February.

96. **Piper malalaganum** C. DC. sp. nov.

Foliis modice petiolatis, oblongo-ovatis basi subaequilatera acutis apice acute acuminatis supra glabris subtus dense et breviter hirsutis, penninerviis nervo centrali usque ad 2 cm supra basin nervos adscendentes utrinque 4 opposite mittente; petiolo breviter hirsuto fere usque ad medium vaginante; stirpis fem. pedunculo tenui parce piloso petiolum paullo superante, spica matura folii limbum subaequante, rhachi hirsuta, bracteae glabrae pelta rotunda centro sessili; ovario libero ovato glabro, stigmatibus 4 e basi subovata acuminatis, bacca submatura elliptica stipitem suum superante.

Dioicum, scandens. Ramuli dense et breviter hirsuti, costulati, spiciferi 1 mm crassi, collenchyma in fasciculos a latere valde elongatos dispositum et libriforme, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis alii peripherici. Limbi in sicco membranacei, pellucido-punctulati, usque ad 12 cm longi et 52 mm lati. Petioli usque ad 2 cm., pedunculi usque ad 2.5 cm longi et vix 1 mm crassi. Spicae submaturae fere 12 cm longae.

MINDANAO, District of Davao, Malalag, *Copeland 696*, March.

97. **Piper villilimbum** C. DC. in Elm. Leafl. Philip. Bot. **3** (1910) 784.

Foliis modice petiolatis, ovato-ellipticis, basi leviter inaequilatera altero latere obtusis altero acutis, apice acute acuminatis, utrinque villosis, penninerviis, nervo centrali in mare a 1 cm supra basin trifido nervosque adscendentes utrinque 2 paullo supra basin mittente, in femina nervos adscendentes utrinque 3 mittente quorum supremus fere a 3 cm supra basin solutus; petiolo villoso basi ima vaginante; maris pedunculo tenuissimo villoso quam petiolus paullo breviore, spica juvenili quam folii limbus pluries breviore, bracteae glabrae pelta orbiculari centro pedicellata; feminae pedunculo tenuissimo, villoso, petiolum paullo superante, spica folii limbum subaequante vel paullo superante, rhachi dense hirtella, bracteae glabrae pelta parva, rotunda centro subsessili, ovario libero glabro, stigmatibus 3 ovato-acuminatis brevibus, bacca matura subglobosa stipitem suum superante.

Dioicum, scandens. Ramuli dense villosi, spiciferi 1 mm crassi, pili usque ad 2 mm longi, collenchyma libriforme continuum, fasciculi intramedullares 1-seriati, canales lysigenes plures quorum unus centralis,

alii peripherici. Limbi in sicco membranacei crebre pellucido-punctulati, superi usque ad 14 cm longi et 4.5 cm lati. Petioli usque ad limbi latus longius 10 mm, inter limbi latera 1 mm longi. Limbi foliorum inferiorum minores, 4–6 cm longi ovato-lanceolati basi aequilatera cordulati, 7-plinervii. Spicae fem. 10 cm longae rhachis 1 mm crassa. Bracteae pelta 0.75 mm diametro. Bacca 4 mm longa.

MINDORO, Baco River, *Merrill 1783*, masc., April. POLILLO, in ravines in hills, altitude about 100 m, scandent, fruit becoming brownish, *Bur. Sci. 6853 Robinson*, fem., August. LUZON, Province of Tayabas, in forests, *Elmer 7382, 7624*, May, a lax and finely branched scandent shrub, the older stems rather wiry and thin; leaves soft, paler beneath; inflorescence pendulous, deep-red when mature (Elmer). MINDANAO, District of Zamboanga, Sax River, *Williams 2343 p. p.*, February.

SPECIES INCERTAE SEDIS, VERISIMILLIME SECTIONIS EUPIPER.

98. **Piper Haenkeanum** Opiz in Reliq. Haenk. 1 (1828) 150.
Piper hirsutissimum Miq. Syst. Pip. (1843) 336.

Ramis teretibus hirsutis, nodis radicantibus, petiolis hirsutis, foliis inferioribus exacte cordatis, superioribus cordato-ovatis oblongis lanceolatisque, 7-plinerviis, utrinque hirsutis, spicis filiformibus folia aequantibus (ex Opiz l. c. et quoad nervationem ex specimine herbarii Haenkeani).

LUZON, Province of Sorsogon, near Sorsogon, *Haenke, fide* Opiz *l. c.*

99. **Piper rufinerve** Opiz l. c. 159.

Ramis teretibus glabris, nodis radicantibus, petiolis glabris, usque ad $\frac{3}{4}$ longitudinis vaginantibus, foliis rotundato-ovatis subcordatisve, basi aequilateris apice acute acuminatis, 7.5 cm longis, 6 cm latis, 5-nerviis (ex Opiz l. c. et ex specimine herbarii Haenkeani).

LUZON, *Haenke, fide* Opiz *l. c.*

100. **Piper lividum** C. DC. in Perk. Frag. Fl. Philip. (1905) 155.
LUZON, Province of Isabela, Malunu, *Warburg 11930*, sterile specimen.

101. **Piper taumanum** C. DC. l. c. 159.
MINDANAO, District of Davao, *Warburg 14741*, sterile specimen.

Sectio MULDERA Hook. f. Fl. Brit. Ind. 5 (1886) 79.

§ *Schizonephros* C. DC. Prodr. 16[1] (1869) 241, emend.

Spicae solitariae, oppositifoliae. Flores dioici. Bracteae cum rhachi concretae, tantum basi et apice ab ea liberae et in cupulam florem includentem inter se connatae. Floris masculi stamina plura, usque ad 10. Floris feminei ovarium liberum.

102. **Piper baccatum** Bl. in Verh. Bat. Genoots. 11 (1826) 172, *tab. 3.*
MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, October.

Sectio HECKERIA Hook. f. Fl. Brit. Ind. **5** (1886) 95.

§ *Potomorphe* C. DC. Prodr. **16**[1] (1869) 331.

Spicae in apice ramuli axillaris subumbellatae vel axillares solitariae. Bractea- libera. Flos hermaphroditus. Stamina 2 vel 3. Ovarium liberum.

103. **Piper umbellatum** Linn. Sp. Pl. (1753) 43, var. **subpeltatum** C. DC. in Donn.-Sm. En. **6**:39.

Piper subpeltatum Willd. Sp. Pl. **1** (1798) 166; C. DC. Prodr. **16**[1] (1869) 333.

Frutex 1 ad 2 m altus.

LUZON, Province of Laguna, *Cuming 441;* Lazaan, *Bur. Sci. 6030 Robinson;* Los Baños, *Bur. Sci. 6723 Robinson:* Province of Bataan, Lamao River, *Williams 334:* Province of Tayabas, Mauban, *For. Bur. 9578 Curran:* Province of Rizal, Bosoboso, *For. Bur. 3315 Ahern's collector, Bur. Sci. 1018 Ramos.* MINDORO, *For. Bur. 8678 Merritt.* MINDANAO, District of Zamboanga, Sax River, *Williams 2144:* District of Davao, Catalonan, *Copeland 930, 1252:* Lake Lanao, Camp Keithley, *Mrs. Clemens 621.* JOLO, Mount Dajo, *Merrill 5330.*

Var. **glabrum**, forma **b** C. DC. in Bull. Herb. Boiss. **6** (1898) 494.

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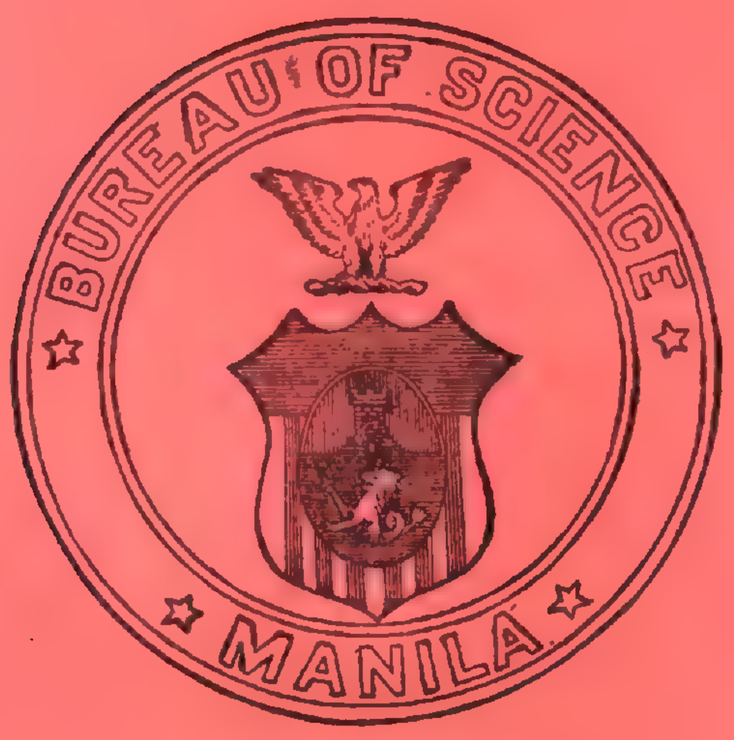

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PHILIPPINE URTICACEAE.

By C. B. ROBINSON.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

This work was originally undertaken with the purpose of ascertaining the relation of the Philippine species of the family to those of other countries yielding valuable products for textiles and cordage, but the systematic problems proved so numerous that they have had to be entered into at length. As a result, the number of species to be credited to the Archipelago has had to be greatly increased, and additions have been made to the list of genera. Whenever possible, the species have been studied in the field as well as in the herbarium; this has been of great assistance in the solution of many problems, and the more intensive collecting thus made necessary has led to the discovery of many additional species, while it seems to indicate that similar work in other parts of the Islands will bring to light many more. An attempt has been made to secure material in considerable quantity, to indicate the variations of the species, at least in one locality. Near the conclusion of the work, I have had the privilege of examining the entire collection of *Urticaceae*, obtained by Mr. A. D. E. Elmer, on Mount Apo, Mindanao, which contains many additions to the species of the family.

The generic difficulties are of two kinds, systematic and bibliographic. The former are often great, reaching their extreme among Philippine species between *Boehmeria* and those species of *Pouzolzia* having serrate leaves. The separation between *Pouzolzia* and *Gonostegia* is made on characters of much less importance than are used in any other case, but

at least two groups are marked out which are easily distinguished one from the other: whereas the difference in general appearance between the entire-leaved and serrate-leaved species of *Pouzolzia* is considerable apart from this character, while the latter in habit can not be distinguished from *Boehmeria;* in the most natural character, that of the styles, the interval is very nearly bridged, even in our species.

Some workers upon Malayan *Urticaceae* have had great difficulty in separating the three genera *Procris, Elatostema,* and *Pellionia.* For their purposes and ours, the difficulty is real if merely the existing keys are studied, that in the *Genera Plantarum* excepted, but disappears on a study of the flowers and inflorescences of the plants themselves. However, it does not seem possible to maintain the genus *Elatostema* with the limits assigned to it by Weddell. He left it as a genus with involucrate or exinvolucrate receptacles, and a pistillate perianth 3- to 5-merous. Among Malay-Philippine species, the difficulty is with a group where the inflorescence on casual examination seems to form a receptacle but is merely an exinvolucrate cyme in nearly all cases greatly condensed. Weddell included the species known to him in *Elatostema;* they caused Hallier to reduce both *Procris* and *Pellionia* to *Elatostema;* Boerlage placed them in *Pellionia.* The last is the true alliance, but the group is here held to be sufficiently distinct from that genus, to be separated under the name *Elatostematoides.* To the writer, the only question is whether it should be considered a genus or a very distinct subgenus under *Pellionia.* If *Androsyce,* made by Weddell a subgenus of *Elatostema,* were found within the Philippines, it would unhesitatingly be treated as entitled to generic rank.

Another genus, *Astrothalamus,* is proposed for a species known from the Mariannes, Philippines, and Borneo, which was placed by Weddell and the writer previously in *Maoutia,* by both with doubt. The distinguishing characters lie in the pistillate inflorescence, which Weddell did not see, and seem amply sufficient to maintain the new status assigned.

Several of the more serious bibliographic problems have arisen through the adoption by Weddell of manuscript names, or maintenance by him of insufficiently published names in preference to suitably published ones of later date. This is especially the case with names appended to plates in Gaudichaud's *Botanique du voyage . . . . . Bonite.* Weddell [1] states that the plates were issued between 1839 and 1846, but they were not accompanied by generic or specific diagnoses, and the explanations of the plates did not appear till 1866. These genera are here dated from the years in which they were taken up by Weddell. Although all cases of the kind are discussed under the genera affected, a brief summary is here made of those where the name is likely to be the subject of dispute.

[1] DC. Prodr. **16**[1]: 235.[22]

Laportea Gaudich., 1826, is antedated by *Urticastrum* Fabr., 1759, the former one of the *nomina conservanda* of the Vienna Congress.

Fleurya Gaudich., 1826, has an alleged synonym in *Kermula* Noronha, 1790: no combinations have been made under the latter name.

Pilea Lindl., 1821, is antedated by *Adicea* Raf., 1815: *nomen conservandum.*

Pellionia Gaudich., 1826, is said to be synonymous with *Polychroa* Lour., 1790.

Elatostema J. R. & G. Forster, 1776, is typified by the species now known as *Procris pedunculata* (Forst.) Wedd., which, under another specific name, is also the type of *Procris.*

Memorialis Ham. in Wall. Cat. was a manuscript name, taken up as a sectional name by Bennett in 1838, and given generic rank by Weddell in 1857. If it be regarded as generically distinct from *Pouzolzia,* the oldest valid name is *Gonostegia* Turcz., 1846, *Hyrtanandra* Miq., 1851, also antedating *Memorialis.*

Distemon Wedd., 1857, is a homonym of *Distemon* Bouché, 1844. The latter is reduced to *Canna,* leaving *Distemon* valid for the Urticaceous genus under the Vienna Code.

Villebrunea Gaudich., Bonite, was first published by Weddell in 1854: Gaudichaud had two species, the first retained by Weddell in the genus, the second subsequently transferred by him to *Urera,* though he continued to cite both plates as belonging to the genus. Weddell, in 1854, had these two and two others, one subsequently retained, the other based on a species of Blume's, which is said to belong to a different family. *Oreocnide* Miquel, 1851, is monogeneric, and as the first published name is here used.

Debregeasia Gaudich., Bonite, taken up by Weddell, 1857, is generally said to have two older synonyms. *Morocarpus* Sieb. & Zucc., 1846, is here rejected as a homonym of *Morocarpus* Adans., 1763, but as the latter is considered a synonym, the name would be available for use instead of *Debregeasia* under the Vienna Code. *Leucocnide* Miq., 1851, had 5 species, the two first distinct species of *Leucosyke,* the other three reduced to one by Weddell under *Debregeasia.* It is here considered to be typified by *Leucosyke capitellata* (Poir.) Wedd., and *Debregeasia* is left as the oldest valid name.

Leucosyke Zoll. & Mor., 1845 or 1846, was eventually maintained by Weddell, although he had taken up, in 1854, *Missiessya* Gaudich., Bonite.

The two departures from ordinary usage in this paper are the substitution of *Oreocnide* for *Villebrunea,* and of *Gonostegia* for *Memorialis.*

Difficulties with specific limits occur at every turn, and become acute owing to the tendency in many of the genera for the forms to cluster around some species, such as *Boehmeria platyphylla* Don, *Elatostema sessile* (Forst.) Wedd., and *Leucosyke capitellata* (Poir.) Wedd.: of all

the more intricate cases of the kind originating in nearly related regions, we escape none. Through the kindness of the Director of Agriculture, Buitenzorg, Java, and of Mr. W. W. Smith, of the Royal Botanic Gardens. Calcutta, I have been able to make many direct comparisons between Philippine and other material: this with the literature available has led to the conclusion that a high percentage of our species are endemic, but this endemism in somewhat curiously distributed between the genera that are here represented by several or by few species, some of the latter being considered monotypic. None of our genera are endemic, of those here proposed as new, *Astrothalamus* being also found in Borneo and the Marianne Islands, *Elatostematoides* probably ranging throughout Malaya.

	Number of genera.	Total Philippine species.	Endemic.	Percentage.
Genera with 1 Philippine species	7	7	1	14.3
Genera with 2 Philippine species	3	6	1	16.7
Genera with more Philippine species	11	116	97	83.6
Total	21	129	99	76.7

DISTRIBUTION OF URTICACEAE IN THE PHILIPPINES AND NEARLY RELATED REGIONS.

Genus.	India.	Malay Archipelago.	China.	Formosa.	Philippines.
Achudemia		1	1		
Astrothalamus		1			1
Boehmeria	10	11	13	5	9
Boehmeriopsis			1		
Chamabainia	1		1		1
Cypholophus		10			3
Debregeasia	6	3	2	1	1
Distemon	1	1			1
Droguetia	1				
Elatostema	32	31	9	5	43
Elatostematoides		10			5
Fleurya	1	4	1	1	2
Forskohlea	1				
Girardinia	1	1	4	2	
Gonostegia (Memorialis)	8	6	2	4	4
Laportea	3	16	8	1	15
Lecanthus	2	1	2	1	1
Leucosyke		7		1	10
Maoutia	1	5			1
Nanocnide			2	1	
Oreocnide (Villebrunea)	2	6	3	2	2
Parietaria	2		1		
Pellionia	12	5	7	3	2
Phenax	1				
Pilea	20	14	20	6	13
Pipturus	2	7			6

Distribution of Urticaceae in the Philippines, etc.—Continued.

Genus.	India.	Malay Archipelago.	China.	Formosa.	Philippines.
Poikilospermum	-------	1	-------	-------	-------
Pouzolzia	5	4	4	2	4
Procris	2	4	1	1	4
Sarcochlamys	1	1	-------	-------	-------
Sceptrocnide	-------	-------	1	-------	-------
Theligonum	-------	-------	1	-------	-------
Urtica	3	1	9	1	1
Total species	[2]118	[3]151	[4]93	[5]37	129
Total genera	23	24	21	16	21

Some of these differences are doubtless due to the more radical or more conservative tendencies of the workers: ultimately, there is every probability that the Malay Archipelago will be found far to excel all of the other regions here enumerated in the number of its species. The above distribution of the Malay species between *Elatostema, Elatostematoides,* and *Pellionia* is very rough: in many cases, the descriptions are quite insufficient to enable an accurate opinion to be formed.

Taken as a whole, the affinities of Philippine *Urticaceae* are undoubtedly Malayan, only one genus found here being unreported from the Malay Islands. This is *Chamabainia,* which is known from India and China. Of the other genera, *Urtica* is cosmopolitan, but the only species here is Malayan: *Laportea* occurs in all the continents except Europe, and some of our species have their closest alliance with those of India, but more with those of Malaya: *Pilea* and *Boehmeria* are tropical or subtropical, in the former is the one species which can positively be said to be introduced only, *P. microphylla* (Linn.) Liebm.: another species here described as *P. humilis,* is very closely allied to *P. peploides,* which ranges from the Galapagos Islands across Oceania and Asia to western Africa; the affinities of the other species are with those of India, Formosa or Malaya. *Boehmeria nivea* (Linn.) Gaudich. is doubtless introduced, but the forms from Sabtan Island seem to fall under the variety *tenacissima,* whose other distribution is such that it may well be indigenous: the other species show alliances with those of India, Malaya, and Formosa.

Two other genera are found in the Tropics of both America and the

[2] Hook. f. Fl. Br. Ind. **5** (1888) 477, 547–594.

[3] Boerl. Handl. Kenn. Fl. Ned. Ind. **3** (1900) 372–381: Schum. & Lauterb. Nachtr. Fl. Deutsch. Schutz. Südsee (1905) 251–256: with some changes.

[4] Forbes & Hemsl. in Journ. Linn. Soc. Bot. **26** (1899) 471–492, **36** (1905) 461, 481, 488, 501, 516, 527, 529.

[5] Kawakami List Pl. Formosa (1910) 103–108.

Old World, *Pouzolzia* and *Fleurya;* one of our species of the latter has somewhat the appearance of an introduced plant, but is of wide distribution from Abyssinia to Polynesia, the other seems not to go west of Java, and so far as our collections show, barely gets into the Philippines in the islands nearest to Borneo. Our species of *Pouzolzia* are certainly indigenous, one has a wide Indo-Malayan distribution, a second seems identical with a Javan species, the others are endemic, one with no near allies, the other nearest to one of Java. The other genera are confined to the Old World, and are mainly tropical, *Pellionia, Procris, Oreocnide,* and *Debregeasia* extending to Japan. However, in the three first, the species are Malayan or with their nearest affinities Malayan: in the last, our only species has hitherto been identified with *D. longifolia* (Burm.) Wedd., ranging from India to Java, but seems more closely allied to the Japanese *D. edulis* Wedd. *Lecanthus* and *Elatostema* range from western Africa to Polynesia, our one species of the former being known with certainty only from India and China: the latter is our richest genus in point of species, some appearing very distinct, several others closely allied to *E. sessile* Forst., originally described from the Society Islands, but with nearly related or possibly identical forms distributed throughout the range of the genus: in other cases the affinities are distinctly Indian, in yet others Malayan: two species seem to be confined to the Philippines and Formosa. *Pipturus* extends from Mauritius to Polynesia, but our species have peculiar features. *P. argenteus* (Forst.) Wedd., with a range from Java to Queensland and Tahiti is found only in the extreme southwestern Philippines; another of our species has in it its closest ally, but not a near one; *P. arborescens,* which is far our commonest species, is otherwise known only from Borneo, and with a very local ally is very distinct from all others of the genus except *P. albidus* (Hook. & Arn.) Wedd., of the Hawaiian Islands; another is considered identical with a Javan species, and is the probable ancestor of the sixth. *Gonostegia* (*Memorialis*) has 4 species, one extending from India to Australia, a second Indo-Malayan, a third is doubtfully identified with an Indian species, the last seems quite distinct. Two other genera extend to India, *Distemon,* monotypic, hitherto known only from that country and Java, and *Maoutia,* ranging to Tahiti. *Leucosyke* until its recent report from Formosa was supposed to find its most northern distribution in the Philippines, where one of its species is very common and identical with one of wide Malayan distribution; it is also the probable ancestor of the remainder with one exception, *L. nivea,* which is allied to *L. candidissima* of Java. The genus *Cypholophus* finds its greatest extension to the east and southeast of the Philippines, our only species extending to the west being that which is very much the most common here. There remain the two genera here segregated, *Elatostematoides* which is probably throughout Malaya, and *Astrothalamus,* known also from Borneo and the Mariannes.

A most unfortunate conflict regarding dates of publication arose half a century and more ago, owing to the fact that the family was being treated in part or whole by different authors at the same time. So far as Philippine problems are involved, Weddell, Blume, and Miquel are chiefly concerned; and as the facts have a wide bearing, it is thought advisable to enumerate here such data as have been gathered.

Weddell's papers were three in number, the first published in the first volume of the fourth series of the *Annales des Sciences Naturelles;* the second, his monograph of the family, in the ninth volume of the *Archives du Muséum;* the third in the first part of the sixteenth volume of the *Prodromus.* The difficulties lie with the second.

Blume's references to species of the family are more or less scattered throughout his publications, but he deals especially with them in certain numbers of the second volume of the *Museum Botanicum Lugduno-Batavum;* over the dates of these there is much difficulty, especially as they were nearly simultaneous with Weddell's monograph. There seems to be no controversy over the actual dates of Miquel's publications, their relative priority being alone involved.

The preface to the second volume of the *Mus. Bot. Lugd.-Bat.* is dated January 6, 1852, the first number is dated 1852, numbers 2 to 8 bear no date. According to a polemic review by Miquel, these were issued together and were on sale on the 1st of February, 1856.[6] It would be unfair, however, to consider Blume as claiming for them the date of 1852, for Weddell's paper in the *Annales* of 1854 is cited as of that year. Parts 9, 10, 11, and 12 are dated as appearing on the 1st of November and December, 1855, and of January and February, 1856, respectively. Miquel[7] says of these that they were on sale by the middle of May, 1856, at Amsterdam, and in Germany somewhat earlier: further, that he had himself seen in the Leyden Herbarium in December, 1855, some of the sheets from which species were alleged to have been published in November, and that there was no indication upon them of anything of the kind having taken place. Parts 13 to 16 are similarly dated as appearing on the first of the months from March to June, 1856; regarding these, I find no definite statements by others; the assigned dates are presumably too early, and it is in them that the worst cases of conflict with Weddell occur, so far as Philippine species are concerned.

Contemporaneous bibliographic notes on Weddell's monograph are surprisingly few, the most important found being by Sir William Hooker.[8] The date of the review is probably October or November of 1857, as it is in the second last number of the volume, and the last is dated December

[6] Bot. Zeit. 14 (14 March, 1856) 185–188.
[7] Bot. Zeit. 14 (1 August, 1856) 540, 541.
[8] Hook. Jour. Bot. & Kew Gard. Misc. 9 (1857) 347–350.

1, 1857. He says, in part: "Again, after the first part of Mr. Weddell's work has appeared in Paris, and whilst the second is announced as ready, . . . a learned botanist in another country, with no materials but what his own herbarium and library afford, suddenly publishes monographs of some of the largest genera of *Urticeæ* . . ."

Weddell himself says in an appendix on page 588 of the monograph, "Pendant que je corrigeais les derniers chapitres de cet ouvrage, on a reçu à Paris les feuilles 13 a 16 du *Museum botanicum lugduno-batavum* de M. le professeur Blume, faisant suite à celles dont il a été question antérieurement (p. 48 et 90). C'est donc dans l'intervalle écoulé entre la publication des feuilles 12 et 13 de ce travail qu'ont paru les 400 premières pages de ma Monographie, dont M. Blume ne semble d'ailleurs pas avoir eu connaissance, bien que la publication de la dernière livraison ait précédé de plusieurs mois celle de la partie de son ouvrage que j'annonce aujourd'hui."

To Dr. B. Daydon Jackson, general secretary of the Linnean Society of London, and to Dr. J. H. Barnhart, of the New York Botanical Garden, I am greatly indebted for additional data. The former writes (to the Director, Royal Botanic Gardens, Kew, who had kindly forwarded to him my request for information).

"I am sorry to say that though I have spent most of the day in the search, I am unable to say what pages and plates came out in 1856. The title-page of Vol. IX of the Archives du Muséum, gives the date thus: '1856–57,' and I have not succeeded in finding any side-light on the separate issues. Thus in Bull. Soc. Bot. Fr. iv. (1857) p. 839, we learn that it came out in 4 parts, and in Hook. Kew Journ. ix. (1857) p. 347 we learn further that part 1 appeared in 1856. The work does not seem to have been reveiwed in the 'Botanische Zeitung,' 'Flora,' 'Gard. Chron.' or 'Linnaea.'

"Our own records show that the thanks of the Society were accorded for parts 1–3 on 21st April 1857, and for part 4 on 5th Nov. 1857. But against this I find under date of 18th Nov. 1856, 'Monographie de la Famille des Urticées par H. A. Weddell, D. M. P. etc. Presented by the Author.' It thus looks as if the author had early *complete* copies, which he distributed in 1856, for that is also the date on the reprint title-page. Afterwards the official distribution took place, but I am unable to give particulars of this.

"No wrappers have been bound in of either copy in our library."

For the purposes of this paper, the decision reached is to accept Weddell's statement with its implication, that the first 400 pages of his monograph appeared between the 12th and the 13th parts of the second volume of the *Mus. Bot. Lugd.-Bat.*, but that fascicle 13 of the latter preceded the remainder of the monograph. It then becomes academic to question whether the date of these later portions of the works of either author was 1856 or 1857.

The evidence is all against taking Blume's statements of dates as accurate, but if certain fascicles appeared at the beginning of February,

and four more by the middle of May, there would seem to be no great improbability in the remaining four having been published in the same year, 1856. There can be no doubt that the first part of the monograph was published in 1856, but it still seems to me probable that the conclusion did not appear till the following year. Hooker's statement is rather positive, and it is possible that the Linnean Society record may have referred to part of the work only. Miquel, also, definitely states in paragraphs where priority was being discussed, that certain portions, *Debregeasia* and *Villebrunea,* which are after page 400, were published in 1857.[9]

To Prof. Lecomte and Dr. Gagnepain, of the Muséum d'Histoire Naturelle, Paris, and to Mr. W. W. Smith, of the Royal Botanic Gardens, Culcutta, I am greatly indebted for comparisons between recent Philippine collections and the types in those institutions and for copies from publications not available here to Lieut.-Col. D. Prain, Director of the Royal Botanic Gardens, Kew, and to Dr. N. L. Britton, Dr. M. A. Howe, Mr. Percy Wilson, and Miss Hilma Johnson, of the New York Botanical Garden.

KEY TO THE PHILIPPINE GENERA OF URTICACEAE.

Plants with stinging hairs; perianth-segments of pistillate flowers 4, always free from the ovary.
- Leaves opposite; stipules lateral; achenes straight ..... 1. *Urtica*
- Leaves alternate; stipules axillary; achenes oblique.
  - Herbs; fruiting perianth not succulent ..... 2. *Fleurya*
  - Trees or shrubs; fruiting perianth succulent ..... 3. *Laportea*

Plants without stinging hairs.
- Pistillate perianth 3- to 5-parted or lobed, always free from the ovary.
  - Leaves opposite.
    - Cymes forming head-like glomerules ..... 4. *Pilea*
    - Flowers crowded in a fleshy receptacle ..... 5. *Lecanthus*
  - Leaves alternate.
    - Trees ..... 3. *Laportea*
    - Herbs or rarely undershrubs.
      - Pistillate perianth biseriate, the 2 inner lobes much larger than the 2 outer ..... 2. *Fleurya*
      - Pistillate perianth uniseriate.
        - Inflorescences exinvolucrate.
          - Both staminate and pistillate inflorescences cymose, sometimes greatly condensed and simulating receptacles, but then never involucrate.
            - Pistillate perianth 4- or 5-parted, at least some of its segments conspicuously corniculate ..... 6. *Pellionia*
            - Pistillate perianth-segments at most obscurely acuminate or corniculate ..... 7. *Elatostematoides*
          - Staminate inflorescences cymose; pistillate flowers crowded on a fleshy receptacle, their perianth 3- or 4-parted, easily separable ..... 8. *Procris*

[9] Ann. Mus. Bot. Lugd.-Bat. **4** (1869) 305, 306.

Both staminate and pistillate inflorescences involucrate; pistillate perianth cupular, usually minute, the lobes obtuse, usually 3, rarely 2 or 4 ..... 9. *Elatostema*

Pistillate perianth tubular, inclosing the ovary or achene, greatly contracted at the mouth.

Stigma linear or filiform.

Stigma persistent.

Fruiting perianth usually membranaceous; stigma not greatly curved. 10. *Boehmeria*

Fruiting perianth succulent; stigma short, greatly curved 15. *Cypholophus*

Stigma deciduous.

Staminate flowers 2-merous ..... 14. *Distemon*

Staminate flowers 4- or 5-merous.

Fruiting perianth membranaceous.

Buds of staminate flowers greatly flattened at the broad apex, usually with a transverse line of hairs at the flexure; nerves extending to the leaf-apex or nearly..... 12. *Gonostegia*

Staminate buds much less flattened; leaf-nerves shorter 11. *Pouzolzia*

Fruiting perianth succulent ..... 16. *Pipturus*

Stigma capitate or subpeltate.

Herbaceous vines with opposite leaves; fruiting perianth membranaceous ..... 13. *Chamabainia*

Trees or shrubs; leaves alternate.

Achenes borne upon a fleshy cupule..... 17. *Oreocnide*

Fruit baccate ..... 18. *Debregeasia*

Pistillate perianth greatly reduced, or wanting, or apparently wanting.

Pistillate perianth disk-like, supporting the base of the achene; flowers in dense glomerules or capitula..... 21. *Leucosyke*

Pistillate perianth wanting, both kinds of flowers in panicles, hardly forming glomerules ..... 20. *Maoutia*

Pistillate perianth very thin, hardly perceptible with the lens; staminate flowers paniculate, pistillate very densely crowded on pedunculate and lobed receptacles ..... 19. *Astrothalamus*

1. URTICA (Tourn.) Linn.

Urtica bullata Blume Mus. Bot. Lugd.-Bat. **2** (1856) 145.

U. grandidentata Miq. Pl. Jungh. (1851) 27, non Moris Stirp. Sard. Elench. **2** (1827–1829) 9, non Liebm. Vidensk. Selsk. Skr. 5^2 (1851) 296.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16049 Curran, Merritt & Zschokke*, wet gully on pine and cogon slope at 2000 m elevation. MINDANAO, District of Davao, Mount Apo, *Elmer 11583*.

Of 4 Benguet plants collected, two have male flowers only, one female flowers only, the fourth has flowers of both sexes, nearly always in different inflorescences. The plants are somewhat intermediate between the above species and *U. thunbergiana* Sieb. & Zucc., as is also *Kawakami 779*, from Formosa; the latter, however, shows the northern alliance, while the Philippine agrees more closely with the Malayan species. Its stipules are ovate, 9–13 mm long, 7–8 mm wide, more or less auriculate at the base. The Formosan plant is herbaceous and more slender with quite different stinging hairs; the leaves of both are doubly serrate.

Weddell [10] prefers Miquel's specific name to that of Blume, reducing the much older *U. grandidentata* of Moris to *U. atrovirens* Rep. in Loisel. Nouv. Not. (1827)

[10] DC. Prodr. **16**^{1} (1869) 55.

40, non Fl. Gall. Loiseleur has probably bare priority over Moris, but if the first edition of the Flora Gallica is intended, he had long previously used the name for a different species, to which I can find no additional reference.

Local name (Apo): *latong*.

Java.

SPECIES E GENERE EXCLUDENDAE.

1. URTICA ARBORESCENS Link Enum. Hort. Berol. **2** (1822) 386; Blanco Fl. Filip. ed. 2 (1845) 483.

U. baccifera Blanco l. c. (1837) 695, non Linn. Sp. Pl. ed. 2 (1763) 1385.

Villar correctly reduced *U. arborescens* Blanco to *Pipturus asper* Wedd. However, Blanco had correctly interpreted Link's species, which has no older name. This is doubtless the species intended by Weddell on page 102 of the monograph as "*U. arborescens*, Lmk.=*Missiessyae* spec." It reappears on page 59 of the Prodromus as "*U. arborescens* Poir.=? *Leucosykes* spec."

2. URTICA ELONGATA Link Enum. Hort. Berol. **2** (1822) 385, nec J. F. Gmel. Syst. (1791) 269, nec aliorum.

U. sessiliflora Blanco l. c. (1837) 696, non Sw. in Vet. Akad. Handl. Stock. (1785) 33.

U. capitata Blanco l. c. ed. 2 (1845) 483, non Linn. Sp. Pl. (1753) 985.

Villar's reduction of Blanco's species to *Fleurya interrupta* Gaudich. is almost certainly correct, although the description of the pistillate flowers points rather to some *Boehmeria*, to which genus Weddell [11] doubtfully assigned, probably by a slip or misprint for this, an otherwise non-existent *U. sessilifolia* Blanco. The reduction of Link's species to *Fleurya interrupta*, though from description, is practically certain.

3. URTICA UMBELLATA Blanco l. c. (1837) 696, (*umbelata*), non Bory Voy. **3** (1804) 173.

U. ferox Blanco l. c. ed. 2 (1845) 484, non Forst. f. Prodr. (1786) 66.

U. meyeniana Walp. in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 422.

All are synonyms of *Laportea meyeniana* (Walp.) Warb.

4. URTICA NIVEA Linn. Sp. Pl. (1753) 985.

Correctly credited to the Philippines by Blanco and others, but only an introduced plant: *Boehmeria nivea* (Linn.) Gaudich.

5. URTICA MANILLENSIS Walp. Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 423.

Bureau,[12] after inspecting the type of this species collected by Meyen and named by Walpers, reduced it to *Fatoua pilosa* Gaudich. The description, which he had been unable to locate, is quite in agreement with this disposition of the species.

6. URTICA HORRIDA HBK. Nov. Gen. & Sp. **2** (1817) 41.

Reported by Walpers, *l. c.* 422, to have been collected at Manila by Meyen, perhaps from a garden. Kunth's species, considered by Weddell to be a variety of *Urera baccifera* (L.) Gaudich., is a native of tropical America, and is very unlikely even to have been cultivated in Manila. Meyen's specimen, if extant, will decide the question.

7. URTICA VILLOSA Blanco l. c. (1837) 695, non Thunb. Fl. Jap. (1784) 70.

Blanco's description is most inadequate and would do for several Philippine species in different genera. Villar's reduction of it to *Pouzolzia indica* Gaudich. (*P. zeylanica* Benn., sensu latiore), is open to no other objection, and may well be accepted.

[11] DC. Prodr. **16** [1] (1869) 66.

[12] DC. Prodr. **17** (1873) 256.

8. URTICA JAPONICA Blanco l. c. (1837) 694, nec Linn. f. Suppl. (1781) 418, nec Thunb. Fl. Jap. (1784) 70.

Villar has reduced this to *Pouzolzia viminea* Wedd. The description of the pistillate flowers indicates either that genus or *Boehmeria*, but no species of the former with serrate leaves have been obtained in recent years in any locality likely to have been visited by Blanco. Of our species, *Boehmeria heterophylla* (Wedd.) Bl. best fits the description, but the habitat, "paredes," is unlikely, though it is known from a number of localities near Manila. This, and other points in the diagnosis suggest *Fleurya interrupta*, but apart from the fact that another of Blanco's species is referable there, the short petioles, axillary flowers, and terminal stigma are too serious obstacles to be overcome.

2. **FLEURYA** Gaudich.

Stinging plants; pistillate pedicels dilated at the apex..... 1. *F. interrupta*
Not stinging; pistillate pedicels not dilated..... 2. *F. ruderalis*

1. **Fleurya interrupta** Gaudich. Bot. Voy. Uran. (1826) 497.

Urtica interrupta Linn. Sp. Pl. (1753) 985.

Boehmeria interrupta Willd. Sp. Pl. 4 [1] (1805) 342.

Urtica elongata Link Enum. Hort. Berol. **2** (1822) 385, nec. J. F. Gmel. Syst. (1791) 269, nec aliorum.

Urtica sessiliflora Blanco Fl. Filip. (1837) 696, non Sw. in Vet. Akad. Handl. Stockh. (1785) 33.

Urtica capitata Blanco Fl. Filip. ed. 2 (1845) 483, non Linn. Sp. Pl. (1753) 985.

Urtica sessilifolia Blanco ex Wedd. in Arch. Mus. Paris **9** (1856) 105, sphalm.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 3358 Ahern's collector;* Manila, *Cuming 722, Merrill 3407, McGregor 82, Philip. Nor. Sch. 441 Buenconsejo;* Malapadnabato, *Phil. Pl. 432 Ramos:* Province of Laguna, Los Baños, *Elmer s. n.:* Province of Tayabas, Infanta, *Bur. Sci. 6799 Robinson;* Atimonan, *Gregory 114:* Province of Albay, Tivi, *Bur. Sci. 6301 Robinson.* POLILLO, *Bur. Sci. 6905 Robinson.* PANAY, Province of Antique, San Jose, *Yoder 25.* MINDANAO, District of Davao, Santa Cruz, *Williams 2960.* (PALMAS ISLAND, *Merrill 5341*, the island then considered to belong to the Philippines, now to Celebes.)

The local name at Bosoboso and Pasig is *lipang aso*, meaning dog-lipa (*Laportea*): this name will be found cited under several species in different genera, as *Laportea* is very widely known, through its stinging properties. The Normal School collection records the Bicol name as *ro-rolagnaton qui Ayam.*

Villar's reduction of Blanco's species is here confidently followed; the description of the flowers also suggests *Boehmeria*, to which it was doubtfully reduced by Weddell. The plants are often very luxuriant, in other cases greatly reduced, and the length of the inflorescence more or less parallels this: it should not be insisted upon as a distinguishing character from *F. ruderalis.*

Abyssinia to New Guinea and Polynesia.

2. **Fleurya ruderalis** Gaudich. Bot. Voy. Uran. (1826) 497.

Urtica ruderalis Forst. Prodr. (1784) 344.

CAVILLI ISLAND, (Sulu Sea), in sandy soil in open thickets along sea-shore, *Phil. Pl. 402 Merrill.* Also seen on the neighboring Island of Arena.

Java to the Marianne, Caroline and Society Islands and New Guinea.

According to Index Kewensis, *Kermula* "Noronha in Verh. Batav. Gen. v. (1790) ed. I. Art. IV. 2," is synonymous with *Fleurya;* if so, it is much the older name: the publication is not available here; no combinations seem ever to

have been made under *Kermula*. The case is not covered by the list of nomina conservanda.

3. LAPORTEA Gaudich.

This genus contains the best-known and longest-remembered stinging plants of the Archipelago. This is especially true of *L. meyeniana* (Walp.) Warb., but other species appear even more virulent, and it is probable that all and certain that nearly all of our species cause extreme irritation. Valuable papers on this property of the genus have appeared in Australia [13] and Paris,[14] and the Philippine side of the case has been briefly stated by the writer.[15] The stinging hairs are silicious, and at least in *L. gigas* contain formic and acetic acids; the effect being therefore both mechanical and poisonous. The latter is much the more pronounced as long as it continues, which may be from a few minutes to two or rarely more days, depending upon the severity of the case. Prompt relief may be had by the use of ammonia, carbonate of sodium, or probably any alkali: this was ascertained in Paris with *L. moroides* Wedd., and independently here with *L. meyeniana*. The ordinary Philippine remedy is to apply to the injured surface the expressed sap from the inner bark of the same tree, and various sufferers have stated that it had given considerable relief. The experiments here gave negative results, but were not prolonged beyond a few minutes, as it was obviously much less efficacious than soda or ammonia. However, the cell-walls continue to produce irritation rather than pain, especially on contact or immersion in water, often for three or four weeks; in one case supposed to have been due to *L. mindanaensis* for six or seven months.

The systematic difficulties are very considerable, and the characters chiefly relied upon in the following key are drawn from pistillate plants, with which it has often been difficult to correlate staminate collections. All of our species fall within Weddell's section *Dendrocnide*, as limited by him, but there is a sharp distinction between those, such as *L. meyeniana*, where the otherwise sessile flowers are borne upon a flabellate receptacle apparently formed by the union of their pedicels, and such cases as *L. luzonensis* where there is no such receptacle and the flowers are pedicelled. The separation of a new section would have been made in this paper, were the type of *Dendrocnide* known to me. All of our species seem to be endemic. The oldest name for the genus is *Urticastrum* Fabr., but *Laportea* is maintained according to the decision of the Vienna Botanical Congress.

[13] Petrie, J. M. The stinging property of the giant nettle-tree. (*Laportea gigas* Wedd.). Proc. Linn. Soc. N. S. Wales **31** (1906) 530–545.

[14] Demilly, J. Les plantes du genre "*Laportea*" Gaudich., leurs caracteres, leur action urticante dangereuse. Bull. Sci. Pharmacol. **13** (1906) 144–149.

[15] Robinson, C. B. Philippine contact-poisonous plants. Bull. Manila Med. Soc. **2** (1910) 207–211.

KEY TO THE PHILIPPINE SPECIES OF LAPORTEA.

Pistillate flowers distinctly pedicelled, not flabellately arranged.
Leaves oblanceolate, lowest veins very short..... 2. *L. anacardioides*
Leaves usually much wider, lowest veins arched-ascending..... 1. *L. luzonensis*
Pistillate flowers flabellately arranged upon a flattened or merely concave receptacle.
Flowers crowded in more than one row on receptacle..... 3. *L. densiflora*
Flowers forming a single row on the margin of the receptacle.
Receptacles much enlarged in fruit.
Mature leaves densely pubescent on both surfaces..... 4. *L. crassifolia*
Upper surface of mature leaves glabrous or nearly so.
Mature receptacles usually over 1 cm in diameter..... 5. *L. batanensis*
Mature receptacles not over 8 mm in diameter.
Pistillate inflorescence only moderately branched, tomentellose. 6. *L. meyeniana*
Pistillate inflorescence very diffusely branched, pilose..... 7. *L. diffusa*
Receptacles not or only slightly enlarged in fruit.
Leaves rigid: receptacles subtended by bracteoles 6 mm long or more. 8. *L. rigidifolia*
Leaves not rigid: bracteoles less than 2 mm long.
Leaves gradually contracted to an acute or subacute base.
Stipules merely ciliate or glabrous..... 9. *L. gracilipes*
Outer surface of stipules densely pubescent.
Leaves oblanceolate, chartaceous..... 10. *L. lanaensis*
Leaves wider, membranaceous or submembranaceous. 11. *L. mindanaensis*
Leaf-bases much wider, cordate, truncate, or at least very obtuse.
Under surface of leaves densely pubescent..... 12. *L. leytensis*
Under surface of leaves glabrous or only obscurely pubescent.
Leaves thickly chartaceous ..... 13. *L. subpeltata*
Leaves membranaceous or submembranaceous..... 11. *L. mindanaensis*
Flowers sessile in a purple, succulent, nearly closed receptacle.. 14. *L. subclausa*

The pistillate flowers of *L. venosa* are as yet unknown, but it probably comes nearest to *L. luzonensis:* see text.

1. **Laportea luzonensis** Warb. in Perk. Frag. Fl. Philip. (1905) 168.

L. crenulata var. *luzonensis* Wedd. in Arch. Mus. Paris **9** (1856) 133.

L. crenulata F.-Vill. Noviss. App. (1882) 204; Vidal Rev. Pl. Vasc. Filip. (1886) 255; non Gaudich. Bot. Voy. Uran. (1826) 498.

LUZON, Province of Ilocos Norte, Bolo River, *For. Bur. 13871 Merritt & Darling:* Province of Bataan, *For. Bur. 2631 Meyer:* Province of Laguna, Calauan, *Cuming 522:* Province of Batangas, Santo Tomas, *Philip. Nor. Sch. 339 Aurelia Malvar.* The following staminate or sterile collections are also probably referable here. LUZON, Province of Benguet, Mount Tonglon, *Merrill 4838:* Province of Bataan, *For. Bur. 6522 Curran:* Province of Laguna, Los Baños, *Elmer s. n.* MINDORO, Baco River, *Merrill 1818;* Subaan, *For. Bur. 11379 Merritt.*

Local name: *lupa,* Ilocos Norte.

2. **Laportea anacardioides** sp. nov.

Inflorescentiis pistilliferis quam petioli longioribus, pedunculis brevibus, non receptaculum dilatatum efformantibus, perianthio subaequaliter 4-partito, achenio non vel vix ventricoso, stigmate anguste conico: foliis oblanceolatis, integerrimis, basi acutis vel subobtusis, apice acuminatis.

Pistillate inflorescences axillary, mostly crowded with the leaves near the apices of the branches, 3 to 7 cm long, usually 3 to 4 times branched, or reduced to panicles, unarmed or with a very few stinging hairs, the individual flowers mostly in threes, each upon a nearly cylindric pedicel 0.5 to 1 mm long, the bracteoles narrowly lanceolate, about 1 mm long; perianth at anthesis less than 1 mm long, nearly equally divided into 4 broadly lanceolate lobes, in fruit somewhat increased, forming a shallow cup with the lobes less conspicuous; ovary suborbicular, compressed, slightly oblique, 1 mm in diameter, stigma narrowly conic, 1 mm long, minutely pubescent, its base 0.3 to 0.4 mm in diameter, the slender apex more or less recurved; achene 2 mm long, black when dry, suborbicular, hardly or not ventricose: staminate inflorescence unknown.

A tree over 10 m high, with a trunk 15 cm in diameter, the bark yellowish, flaky, the vegetative parts apparently glabrous: leaves at the ends of the branches, their petioles 1.5 to 4 cm long, the lamina membranaceous or nearly chartaceous, oblanceolate, somewhat but irregularly inequilateral, 15 to 22 cm long, 3 to 5.3 cm wide, the greatly narrowed base acute or subobtuse, the margins entire, the apex forming an acute or nearly acute acumen 5 to 10 mm long; lateral veins on each side of the midrib 14 to 16, parallel-ascending or the upper arched, not forming a marginal vein; stipules triangular-lanceolate, glabrous, acute, 9 mm long.

MINDANAO, District of Davao, Santa Cruz, *Williams 2766*. Distinguished from the preceding not only by the narrower leaves with more numerous and less arched veins, but by the much less ventricose ovary and achene, and other characters.

3. **Laportea densiflora** sp. nov.

Inflorescentiis pistilliferis longis, admodum late divaricatis, dense pubescentibus; floribus in receptaculis flabellatis congestis; perianthio admodum alte quadrifido, stigmate subulato: foliis late ovalibus, magnis, basi cordatis, apice brevissime acuminatis, venis utrinque 16.

Pistillate inflorescence (one seen), about 26.5 cm long, rather widely branching, the rachises densely covered with whitish or brownish pubescence: flowers sessile, crowded upon the surface and margins of receptacles; the receptacles about 20-flowered, 1 to 2 mm in diameter, their pedicels mostly about 3 mm long; bracteoles ovate, obtuse, acuminate, 1 mm long: perianth about 0.5 mm long, its 4 lobes lanceolate, acuminate; ovary compressed, oval, somewhat ventricose, about 1 mm long, stigma subulate, pubescent, about 2 mm long. Staminate inflorescence (only one seen), about 8 cm long, the flowers apparently grouped as the pistillate, but too immature.

A tree 8 m high, with a stem 8 cm in diameter: leaves with petioles 11.5 cm long (one complete specimen), lamina subcoriaceous, broadly oval or ovate, 32 cm long, 23 cm wide, the base cordate, the margins entire, the extreme apex forming a very short acumen; lateral veins on each side of

the midrib about 16, the veins connecting the lower vein with the margin as well as those connecting succeeding pairs of veins very distinct, nearly straight or more or less curved, with in addition one or two veins similar to the first branch of the basal vein running from the insertion of the petiole a short distance below the basal vein itself; veins of both surfaces and sometimes the lamina of the lower surface more or less pubescent, the lower surface of the midrib densely pubescent; stipules triangular-lanceolate, very acute, 15 mm long.

MINDORO, Baco River, *Merrill 998* (staminate). MINDANAO, District of Zamboanga, San Ramon, *Hallier s. n.* (type, pistillate).

4. **Laportea crassifolia** sp. nov.

Inflorescentiis pistilliferis longis, pubescentibus, floribus sessillibus in receptaculis flabellatis admodum congestis, perianthio 4-partito, lobis interioribus longioribus angustioribusque: foliis magnis, coriaceis, ovatis vel suborbicularibus, utrinque dense pubescentibus, basi cordatis, margine dentatis.

Pistillate inflorescences 12 to 30 cm long, the peduncle and rachises stout, densely hoary-pubescent, widely branched: flowers sessile, 12 to 15 in number, in flabellate receptacles about 2 mm in width, with pedicels 1 to 2 mm long, passing gradually into the receptacle itself; bracteoles 1.5 mm long, oblong, acutely acuminate: perianth 4-parted, the two inner 0.5 mm long, triangular-lanceolate, acute, the outer shorter, ovate, acutely acuminate, all sparingly pubescent on the outer surface, ovary ovoid-compressed, less than 1 mm long, ventricose, hardly oblique, passing gradually into the subulate pubescent stigma, which is about 2 mm long and curved at the apex: fruiting receptacles white, varying in size with development, attaining a width of at least 12 mm, the achene orbicular-ovate, compressed, 2.5 mm long, its surface more or less tuberculate: immature staminate inflorescences 8 mm long, densely pubescent, the flowers crowded in glomerules: perianth-segments 4, ovate, cucullate, 1 mm long.

A tree about 6 m high, its stem 15 cm in diameter; leaves with stout densely pubescent petioles 6 to 12 cm long, the coriaceous lamina 20 to 30 cm long, 13 to 30 cm wide, the base cordate, the margins except in the basal sinus forming more or less shallow but very conspicuous acute or obtuse teeth, the sinuses rounded or truncate, apices shortly acuminate; both surfaces, especially the under, densely covered with grayish or yellowish pubescence; lateral veins on each side of the midrib 12 to 15, arched-ascending, the veins connecting these fairly conspicuous; stipules elliptic, membranaceous, 25 mm long, glabrous except the midvein.

MINDANAO, District of Lanao, Mataline Falls, *For. Bur. 3925 Hutchinson* (pistillate flowers, type): Lake Lanao, *Mrs. Clemens 177* (staminate), *s. n.* (fruiting).

Local name: *sagay*, Misamis.

5. **Laportea batanensis** sp. nov.

Floribus pistilliferis in receptaculis flabellatis fructu valde auctis suffultis: foliis membranaceis, inaequilateralibus, ellipticis, ovalibus, vel oblongo-obovatis, basi truncatis vel rotundatis, emarginatis, margine integris, apice acuminatis.

Pistillate inflorescences 7 to 22 cm long, widely branching, pubescent especially on the younger branches: flowers sessile along the distal margin of a flattened flabellate receptacle 1 to 1.5 mm wide, 5 to 10 on each, the pedicels of the receptacles less than 1 mm long, bracteoles lanceolate, less than 1 mm long, inconspicuous: perianth-segments 4, lanceolate, 0.5 mm long, nearly equal; ovary 0.6 mm long, slightly oblique and ventricose; stigma 1.5 mm long, pubescent, often flattened and dilated distally: width of fruiting receptacles ranging to more than 1 cm, the achenes no longer marginal, compressed, obliquely suborbicular, 3 mm long, ventricose, strongly and coarsely tuberculate: staminate inflorescence unknown.

A tree 5 to 7 m high, its stem about 15 cm in diameter, glaucescent and glabrescent at the apex: leaves with pubescent petioles 1 to 4 cm long, the membranaceous lamina elliptic, oval, or oblong-obovate, 9 to 19 cm long, 5 to 12 cm wide, the base rounded or truncate, emarginate, the margins entire, gradually narrowed and acuminate; lateral veins on each side of the midrib 9 to 13, arched-ascending, the veins of the lower surface more or less pubescent, especially when young; stipules ovate, acute or acutely acuminate, 8 mm long.

BATANES ISLANDS, Batan Island, Santo Domingo de Basco, *Bur. Sci. 3719 Fénix.* Noted as very poisonous.

Among Philippine species, this most closely approaches the next, from which its greatly enlarged fruiting receptacles seem to separate it: it is difficult to distinguish it, upon the floral characters given by Weddell, from his *L. pterostigma*, of Formosa, but the description of the leaves in texture, shape, and pubescence, make such an identification at least temporarily impossible.

Local name: *jayeng.*

6. **Laportea meyeniana** Warb. in Perk. Frag. Fl. Philip. (1905) 168.

Urtica (?) *meyeniana* Walp. Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 422.

L. gaudichaudiana Wedd. in Arch. Mus. Paris 9 (1856) 137.

Urera gaudichaudiana Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 177.

Urtica umbellata (*umbelata*) Blanco Fl. Filip. (1837) 696, non Bory Voy. 3 (1804) 173.

Urtica ferox Blanco l. c. ed. 2 (1845) 484, non Forst. f. Prodr. (1786) 66.

LUZON, Province of Cagayan, Tuguegarao, *Bolster 184:* Province of Nueva Vizcaya, Bagabag, *For. Bur. 18420 Alvarez:* Province of Benguet, Sablan, *Williams 1548;* Twin Peaks, *Elmer 6464:* Province of Tayabas, Infanta, *Whitford 850:* Province of Pampanga, Mount Arayat, *Bolster 62:* Province of Rizal, Mariquina, *For. Bur. 5199 Curran;* Montalban, *Bur. Sci. 9519 Robinson;* Guadalupe, *Phil. Pl. 438 Ramos;* Manila, *Meyen* (carbon impression), *Bur. Sci. 12142 Ramos:* Province of Laguna, Los Baños, *Elmer s. n.:* Province of Cavite, Silang, *For. Bur. 7692 Curran.* MINDORO, Cauayan, *For. Bur. 3708 Merritt.*

Some of these specimens are not typical, and the species as here interpreted

may be capable of further segregation. Weddell in DC. Prodr. 16[1]: 63, doubtfully reduced *Urtica meyeniana* Walp. to *Laportea stimulans* Miq., which may be the reason why that species is credited to the Philippines by Stapf.[16] Weddell also, l. c. 67, appears to reduce *U. umbellata* Blanco to *Pilea umbellata* Wedd., but there may have been an omission.

Local names: *lipa, lipang calabao, lipai, lopa;* also *alalatang* in Cagayan and *alalupa* in Nueva Vizcaya.

7. **Laportea diffusa** sp. nov.

Arbor: inflorescentiis pistilliferis longissimis, late diffusis; floribus sessilibus vel subsessilibus in receptaculis flabellatim dispositis: foliis longe petiolatis ovalibus, basi cordatis, apice subabrupte breviter acuminatis, 5-plinerviis vel minus conspicue 7-plinerviis, venis superioribus 8 ad 10.

Pistillate inflorescences attaining a length of at least 45 cm, their branches often fascicled in threes, 7 to 10 cm long, themselves diffusely branched, the rachis and its branches strongly flattened when dry, probably succulent when fresh, cinereous-pilose; the receptacles at anthesis about 1.5 mm in diameter, solitary or two or three approximate, appearing as one, on pedicels 1 to 2 mm long, bearing 4 to 6 flowers: flowers sessile or subsessile; perianth-lobes 4, lanceolate to ovate but of about equal length, 0.4 mm, acuminate or mucronate, pubescent, rarely with a few stinging hairs; ovary in outline oblong-lanceolate, about 1 mm long; stigma somewhat longer than the ovary, densely pubescent, often recurved: fruiting receptacles attaining 8 mm in diameter; achenes 2 mm in diameter, strongly compressed, nearly circular in outline but ventricose on one side, tipped with the base of the stigma, obscurely lined.

A tree 5 m high, with a trunk 30 cm in diameter, the apices of the branches covered with yellow bark; leaves on petioles 5 to 18 cm long, when dried strongly flattened especially near the base, there attaining 1 cm in width, densely pubescent, the lamina submembranaceous, attaining a length of 33 cm and a width of 21 cm, the base cordate, the margins especially toward the apex with numerous very short blunt teeth, the apex contracted into a triangular acumen 3 cm long, the upper surface glabrous except on the midrib and veins, the under surface densely white-pilose; 5- or 7-plinerved, the uppermost pair extending about one-third the length of the leaf; additional pairs of veins 8 to 12, the apical ones indistinct, united by numerous veins which are more conspicuous on the under surface; stipules lanceolate, acuminate, about 13 mm long.

Luzon, Province of Tarlac, O'Donnell, *For. Bur. 5149 Curran.* Distinguished from the last by its very diffuse, pilose inflorescence, and the different shape and margins of the leaves.

Local name: *lipa.*

[16] Trans. Linn. Soc. Bot. II 4 (1894) 227.

8. **Laportea rigidifolia** sp. nov.

Inflorescentiis pistiliferis longiusculis, floribus in receptaculis conspicue bracteatis suffultis: foliis rigidis, lanceolatis, oblongo-lanceolatis, vel ellipticis, basi emarginatis, margine integris, apice acutis vel acute subacuminatis.

Pistillate inflorescences 12 to 20 cm long, the rachises sparingly pubescent, the branches mostly short, with bracts up to 1 cm in length at their insertion on the rachis: flowers in a single marginal row on flabellate receptacles about 4 mm wide, bearing numerous bracteoles 3.5 to 5 mm long, and with numerous stinging hairs on the portion of the surface not covered by flowers: perianth-segments 4, lanceolate to ovate, over 1 mm long, armed with a few stinging hairs; ovary about 1 mm long, the subulate stigma 2 to 3 mm long: fruiting receptacles apparently not enlarged, the achenes obliquely orbicular, compressed, 5 mm in diameter, minutely tuberculate.

A shrub or small tree 2 to 3 m high, with a stem 10 cm in diameter: leaves with petioles 3.5 to 6 cm long, the rigidly coriaceous lamina lanceolate, oblong-lanceolate, or elliptic, 20 to 26 cm long, 5 to 8.5 cm wide, the base rounded or gradually narrowed, more or less emarginate, the margins entire, revolute, the apex acutely acuminate or merely acute; lateral veins on each side of the midrib 9 to 11, strongly ascending, coarse and projecting on the lower surface, under surface of the young leaves densely pubescent, glabrescent when mature except on the veins, upper surface glabrous; stipules (or bracts at the insertion of the inflorescence) ovate, 2.5 cm long.

Luzon, Province of Benguet, Mount Tonglon (Santo Tomas), *Williams 991* (type); Cayapa, *For. Bur. 15801 Curran.*

9. **Laportea gracilipes** Elmer Leafl. Philip. Bot. 3 (1910) 876.

Arbor parva, erecta: inflorescentiis solitariis, axillaribus, laxe ramosis, 12 ad 25 cm longis, rhachidibus stimulis instructis; receptaculis carnosis, siccitate 3 ad 5 mm diametro, flores sessiles circiter 10 flabellatim gerentibus: foliis petiolis 3.5 ad 5 cm longis suffultis, laminis siccis submembranaceis, oblanceolatis vel rarius ellipticis vel oblongis, 8 ad 17 cm longis, basi acutis, apice abrupte breviterque acuminatis, margine integris, utrinque glabris vel subtus obscure pilosiusculis; stipulis lanceolato-ovatis, glabris vel margine modo ciliatis, 8 ad 10 mm longis.

Mindanao, District of Davao, Mount Apo, Todaya, at 1200 m elevation, *Elmer 10499.*

Local name: *sigmit.*

10. **Laportea lanaensis** sp. nov.

Arbor (?): inflorescentiis multo minus ramosis, rhachidibus stimuliferis; floribus fructibusque sessilibus, in receptaculis flabellatim dispositis: foliis longiuscule petiolatis, oblanceolatis, elliptico-oblanceolatis, vel obo-

vatis, 12 ad 17 cm longis, basi valde angustatis, acutis vel brevissime cordatulis, margine integris, apice breviter acuminatis; stipulis ovatis, extus dense pubescentibus.

Pistillate inflorescences 7 to at least 24 cm long, their branches apparently not widely spreading, not seen beyond 5 cm in length, densely clothed with stinging-hairs; receptacles on pedicels 1 to 3 mm long, bearing 6 to 8 flabellately arranged flowers: perianth-segments 4, subequal in length, 0.4 mm long, lanceolate to ovate, their outer surfaces pubescent; ovary about 0.6 mm long; stigma 1.5 to 2 mm long, pubescent: fruiting receptacles about 4 mm in diameter, the achenes strongly compressed, nearly circular in outline, 2.5 mm long, the stigma often persistent.

Probably a small tree, the branches covered with brownish or yellowish glabrous bark: leaves with glabrous petioles 4 to 8 cm long, the chartaceous lamina oblanceolate, elliptic-oblanceolate, or obovate, 12 to 17 cm long, 4 to 8 cm wide, gradually contracted to an acute or very shallowly cordate base, the margins entire or obscurely sinuate, the apex rather gradually contracted into an acumen less than 1 cm long; glabrous on both surfaces or the under obscurely puberulent, the venation of the under often well marked by conspicuous white cystoliths; pinnately veined, veins 10 to 12 pairs; stipules ovate, densely pubescent on the outer surface, about 8 mm long.

MINDANAO, District of Lanao, Camp Keithley, *Mrs. Clemens 462* (type), *s. n.*

11. **Laportea mindanaensis** Warb. in Perk. Frag. Fl. Philip. (1905) 168.

LUZON, *Loher 5009*. MINDANAO, District of Davao, Taumo, *Warburg 14702* (carbon impression); Davao, *Copeland 608, 609, DeVore & Hoover 182;* Santa Cruz, *Williams 2810*, the last of somewhat different appearance, though I find no adequate characters upon which to separate it. The leaf-bases vary upon the same plant.

12. **Laportea leytensis** sp. nov.

Inflorescentiis pistilliferis admodum longis, ramosis, stimuliferis, floribus sessilibus in receptaculis flabellatim dispositis; bracteis ovatis costam versus pubescentibus: foliis subrigide coriaceis, ovali-ovatis vel ovali-obovatis, basi rotundatis, margine siccitate revolutis, apice breviter acute acuminatis.

Pistillate inflorescences attaining a length of at least 20 cm, subtended at the base by ovate, acute bracts 12 to 15 mm long, densely pubescent on the midvein and sparingly near it; bracteoles at the nodes of the inflorescence subpersistent, lanceolate, the lowest about 7 mm long, decreasing toward the apex; the rachis and its branches, especially toward their apices armed with stinging hairs: receptacles about 2.5 mm in diameter, on pedicels 3 to 5 mm long, bearing about 10 flabellately arranged, sessile flowers: perianth-segments 4, subequal, lanceolate, 0.5 mm long, ciliate; ovary compressed-ovoid, 0.7 mm long; stigma about 1.5 mm long, pubes-

cent, recurving: achenes compressed, nearly circular in outline, over 2.5 mm in diameter.

A widely spreading tree, its branchlets covered with yellowish bark: leaves on petioles 3 to 8 cm long, the younger pilose, the older glabrous or nearly so; lamina somewhat rigidly chartaceous, oval-ovate to oval-obovate, 16 to over 20 cm long, 6.5 to 13 cm wide, the base broadly rounded, very close to the petiole becoming acute, the margins when dry revolute, the apex contracted into a slender acute acumen, the upper surface glabrous or when young with a few scattered hairs, the under brown-lepidote and shortly white-pilose; 5-plinerved, the upper pair of nerves extending one-third the length of the lamina or more, additional pairs of veins 20 to 12.

LEYTE, Palo, *Elmer 7351.*

13. **Laportea subpeltata** sp. nov.

Inflorescentiis pistilliferis admodum longis, ramosis, stimuliferis, floribus sessilibus in receptaculis flabellatim dispositis: foliis rigide chartaceis, ovalibus, basi rotundatis, subpeltatis, margine undulatis, apice brevissime acuminatis; 5- vel 7-plinerviis; stipulis ovatis, extus dense pubescentibus.

Pistillate inflorescences nearly 20 cm long, the branches attaining 6 cm, the rachises especially toward the apex armed with stinging hairs; receptacles about 4 mm in diameter, on pedicels 2 to 7 mm long, bearing rather numerous flabellately arranged sessile flowers: perianth-segments 4, lanceolate, pubescent, about 0.6 mm long; ovary compressed, oval in outline, about 0.6 mm long; stigma pubescent, attaining nearly 2 mm in length, recurving: achenes hardly mature.

A tree 10.5 m high, with a trunk 15 cm in diameter, the glabrous bark of the ultimate branchlets very dark-red when dry: leaves on puberulent petioles 3.5 to 7 cm long, the lamina rigidly chartaceous, oval, 11 to 18 cm long, 6.5 to 12 cm wide, the base broadly rounded, very shallowly cordate, subpeltate, the margins undulate, when dry slightly revolute, the apex abruptly contracted into a small acumen 2 to 3 mm long; upper surface dark-green, under light-green when fresh, both drying brown, when young densely pilose on the veins and somewhat between them, when mature glabrous except for a few hairs on the principal veins; 5- or 7-plinerved, the uppermost pair of nerves extending from one-fourth to one-third the length of the lamina, additional pairs of veins 9 to 12; stipules ovate, very shortly acuminate, densely pubescent on the outer surface except the margins, nearly 1 cm long.

MINDANAO, Province of Misamis, Bliss River, at 1050 m elevation on low land near river, *For. Bur. 4586 Mearns & Hutchinson.* Of our species, this is probably closest to *L. densiflora*, but in the latter the leaves are larger, more deeply cordate at the base, the under surface especially on the mid-vein and the inflorescence is more pubescent while the stipules are glabrous.

Local name (Moro): *sagí.*

14. **Laportea subclausa** sp. nov.

Inflorescentiis pistilliferis longis, parce ramosis, floribus in receptaculis dense stimuliferis, jam carnosis, subclausis, suffultis: foliis longe petiolatis, chartaceis, oblongo-ellipticis vel late ellipticis, basi emarginatis, margine integris, apice acutis vel acuminatis, saepe admodum falcatis.

Pistillate inflorescences purple, 25 to 35 cm long, sparingly branched, the rachis usually densely clothed with rather short stinging hairs: flowers sessile in pale-blue violet or purple depressed-globose receptacles, which are densely clothed with stinging hairs and at anthesis already somewhat fleshy and except at the extreme apex closed over the flowers; bracteoles lanceolate, acuminate, 3 mm long: perianth-segments 4, narrowly lanceolate, 1 mm long; ovary lanceolate, compressed, 0.8 mm long, tapering into a stigma of about equal length: fruiting receptacles up to 1 cm in diameter; achenes ovoid, compressed, nearly smooth.

A shrub 1 to 3 high: leaves with petioles 6.5 to 23.5 cm long, the chartaceous lamina oblong-elliptic or broadly elliptic, 25 to 53 cm long, 7 to 23 cm wide, the base emarginate or subpeltate, the apex gradually narrowed to an acute point or somewhat acuminate, often slightly falcate; lateral veins on each side of the midrib 12 to 15, strongly ascending, arched or nearly straight; upper surface of lamina glabrous, under surface tomentellose; stipules (?) broadly lanceolate, 2 cm long.

Luzon, Province of Laguna, Mount Maquiling, *Merrill 6290* (type), in mossy forest at 1050 m elevation, *Bur. Sci. 9731 Robinson, Phil. Pl. 294 Merrill*, in rain forest at 840 m elevation. Seen also, but sterile, on Mount Banajao.

15. **Laportea venosa** Elmer Leafl. Philip. Bot. 3 (1910) 878.

Inflorescentiis staminiferis paniculato-cymosis, parce puberulis, 5 ad 8 cm longis, pedunculo 2 ad 3 cm longo, floribus in glomerulis haud confluentibus dispositis, tetrameris, perianthii lobis late lanceolatis, 2 ad 2.5 mm longis, obtuse acuminatis, ovarii rudimento stipitato, subgloboso, 0.7 mm longo: arbor, foliis alternis, modice petiolatis, laminis chartaceis saepe obliquis, ovatis, ellipticis, vel oblongo-lanceolatis, 10 ad 22 cm longis, 4.5 ad 9 cm latis, basi subpeltata rotundatis vel angustatis truncatisque, margine admodum revoluta subintegris, apice breviuscule acuteque acuminatis; venis utrinque 7 ad 9 cum reticulatione conspicuis; stipulis ovatis, caudatis, dense pubescentibus.

Mindanao, District of Davao, Mount Buribid, at 1200 m elevation, *Elmer 11948*.

The absence of pistillate flowers prevents the inclusion of this species in the key, but it seems closely allied to *L. luzonensis*, differing from it in the much more conspicuous leaf-venation, the greater protraction of the basal veins and the more densely pubescent stipules. There are probably other undescribed species in this herbarium, as yet unrepresented by pistillate material.

Local name: *sigmit*.

The following species, credited to the Philippines by Fernandez-Villar,[17] have

[17] Noviss. App. (1880) 204.

not appeared in recent collections, and may be represented by some of the preceding, although we have nothing nearly resembling plate 689 of Wight's Icones, cited by him.

1. LAPORTEA DECUMANA Wedd. in Arch. Mus. Paris **9** (1856) 127.
2. L. PELTATA Gaudich. Bot. Voy. Uran. (1826) 498.

4. PILEA Lindl.[18]

KEY TO THE PHILIPPINE SPECIES OF PILEA.

Leaf-venation pinnate, obscure ..... 1. *P. microphylla*
Leaves distinctly trinerved or triplinerved.
  Prostrate or nearly so: leaves not exceeding 1 cm in length, their margins entire or obscurely sinuate ..... 2. *P. humilis*
  Erect or at most reclining, leaves longer, the margins serrate or dentate.
    Inflorescences distinctly longer than the corresponding petioles.
      Cystoliths very conspicuous on both surfaces, rendering the nerves glaucescent beneath ..... 3. *P. benguetensis*
      Cystoliths inconspicuous or wanting on upper surface, nerves not glaucescent.
        Leaves chartaceous ..... 4. *P. monticola*
        Leaves membranaceous ..... 5. *P. melastomoides*
    Inflorescences not or very slightly exceeding the petioles.
      Leaves rigid ..... 7. *P. rigida*
      Leaves membranaceous.
        Transverse veins between costa and nerves conspicuous, reticulations also conspicuous.
          Stipules over 1 cm long ..... 13. *P. sylvatica*
          Stipules 3 to 5 mm, conspicuous ..... 12. *P. dataensis*
          Stipules shorter, inconspicuous.
            Leaf-bases acute.
              Leaves over 12 cm long ..... 6. *P. robinsonii*
              Leaves never over 8 cm ..... 9. *P. apoensis*
            Leaf-bases obtuse or cordulate ..... 8. *P. luzonensis*
        Transverse veins usually very obscure, reticulations always so.
          Under surface of leaves glaucous ..... 10. *P. intumescens*
          Under surface of leaves not glaucous ..... 11. *P. calcicola*

Of these, the perianth-lobes of the pistillate flowers are subequal only in *P. sylvatica*, *P. dataensis*, and sometimes in *P. monticola*, they are unknown in *P. intumescens*.

1. **Pilea microphylla** Liebm. Vidensk. Selsk. Skr. 5^2 (1851) 302.
Parietaria microphylla Linn. Syst. ed. 10 (1759) 1308.
Pilea muscosa Lindl. Coll. Bot. (1821) *pl. 4*.

So very common a weed in at least very many places in the Philippines that it is rarely collected, the localities shown on the sheets in this herbarium being in the provinces of Pampanga, Rizal (including Manila), Laguna, Tayabas (including the island of Polillo), and Albay, all in Luzon, also the islands of Mindanao, Jolo, and Palawan. However, it is not reported either by Blanco or Fernandez-Villar: Weddell, in 1869, credited it to the New World only; it is now known also from India, Ceylon, the Malay Peninsula, and China.

[18] The name *Pilea* is antedated by *Adicea* Raf., but the former is one of the *nomina conservanda* of the Vienna Botanical Congress.

2. **Pilea humilis** sp. nov.

Species P. peploidei (Gaudich.) Hook. & Arn. valde affinis, sed differt cymis pedunculatis, perianthii pistilliferi lobo intermedio multo latiore.

Cymes glomerulate, borne on peduncles attaining 14 mm in length, but rarely exceeding 1 cm, and often considerably less especially in the uppermost axils; flowers of both kinds intermixed in at least some of the glomerules, the staminate actually found only in the uppermost ones, all shortly pedicellate, the pedicels varying in length with the age of the flowers, those of the pistillate roughly 0.5 mm long, those of the staminate longer: perianth-lobes of staminate flowers 4, oblong-ovate or ovate, 0.8 mm long, cucullate; filaments 1 mm long; anthers white, about 0.5 mm long: perianth-lobes of pistillate flowers 3, the intermediate oval or orbicular, 0.7 mm long, sometimes very obscurely serrulate on the margins, the laterals suborbicular, 0.1 to 0.2 mm long; ovary compressed-ovate, smooth, somewhat exceeding the intermediate perianth-lobe; stigma penicillate, very short.

Entirely glabrous: stems weak, reclining, often branching and rooting at the nodes, but apparently never branching at the base, the branches ascending, the stems from 4 to 16 cm long: leaves opposite, those of a pair equal, the petioles 1 to 2 mm long, the lamina membranaceous, orbicular, orbicular-ovate, or broadly oval, attaining 1 cm in length but usually 5 to 6 mm, often shorter, the base rounded or acuminate, the margins entire or obscurely sinuate, the apex very broadly and obtusely acuminate; trinerved, other venation very obscure, but 1 or rarely 2 additional veins sometimes visible; upper surface with numerous comparatively long cystoliths, usually showing also on the under surface, which is also in many cases sparingly punctate; stipules inconspicuous.

Luzon, District of Bontoc, *Vanoverbergh 761:* District of Lepanto, Cervantes to Balili, *Merrill 4457:* Province of Benguet, Mount Pulog, *Merrill 6510, For. Bur. 16042, 16046 Curran, Merritt, & Zschokke;* Baguio, *Elmer 6598.* Negros, Canlaon Volcano, *Merrill 6912* (type), *Phil. Pl. 273 Merrill.*

It is with the utmost diffidence that this is separated from *P. peploides*, especially in view of the very wide distribution credited to that species (Galapagos Islands to India), but every description available here indicates it as differing in the characters above noted; there seem also to be characters in the leaves but these are small and variable. The Philippine plant is a high-mountain form, ranging from 1250 to 2850 m. *P. johniana* Stapf is also allied, but much less closely to either of these species than they are to one another.

3. **Pilea benguetensis** sp. nov.

Suffruticosa: inflorescentiis axillaribus, laxe glomerulo-cymosis; floribus pistilliferis sepalis 3, inaequalibus, ovario verruculoso: foliis parum inaequalibus, lanceolatis, subcaudatis, saepe falcatis, triplinerviis, dentatis.

Inflorescences axillary, monoecious, 2 to 5 cm long, branched, the peduncles 1 to 1.5 cm long, and exceeding the petioles, the glomerules not confluent except at the apex: staminate flowers with 4 sepals 1.5 mm

long, lanceolate to ovate, with a process arising from the dorsal surface near the apex; stamens 4, 1 mm long, filaments free, very short; rudiment of ovary small: pistillate flowers with 3 sepals, the dorsal 0.7 to 1 mm long, oblanceolate, acuminate, the laterals about half this length, lanceolate; staminodes about the same length as the sepals but somewhat narrower, caducous; ovary elliptic, becoming ovoid in fruit, verruculose, with the very short, penicillate stigmas about 1 mm long.

Suffrutescent, more or less branching, 40 to 80 cm high, glabrous: leaves opposite, petioles 4 to 15 mm long, those of a pair nearly equal or more often distinctly unequal; lamina of leaves of a pair subequal, lanceolate, 3.5 to 9 cm long, 1 to 2.2 cm wide, triplinerved, inequilateral, the base rounded, truncate, or sometimes acute on one side, the margins dentate-serrate, the apices subcaudate, more often falcate, cystoliths present on both surfaces; stipules lanceolate, 1 mm long, deciduous.

LUZON, Province of Benguet, Baguio, *Elmer 6304* (type), *Williams s. n., For. Bur. 4837 Curran;* Mount Pulog, *For. Bur. 16052 Curran, Merritt, & Zschokke.*

By description, greatly resembling *P. bracteosa* Wedd., an Indian species recently reported from Formosa: through the kindness of W. W. Smith, Esq., of the Royal Botanic Gardens, Calcutta, material of the Philippine species has been compared with Indian material of *P. bracteosa*, and found to differ in its shorter-petioled and less ovate leaves, and its less marked serration.

4. **Pilea monticola** sp. nov.

Herba vel suffrutex glaber: inflorescentiis axillaribus, in caulibus vel in ramis brevibus foliiferis suffultis, quam petioli saltem maturis longioribus; florum pistilliferorum perianthio 3-partito, segmentis conspicue inaequalibus vel subaequalibus: foliis chartaceis vel firmiter membranaceis, ellipticis vel ovalibus, quam in specie sequente minoribus et brevius petiolatis, basi attenuata acutis vel obtusis.

Inflorescences borne in the axils of leaves on the stems or on short leafy branches, attaining 9 cm in length but often much shorter especially in the apical axils, usually and when mature probably always exceeding the petioles in length, the peduncles alone of the staminate and at least sometimes of the pistillate inflorescence exceeding the petiole: perianth-segments of staminate flowers 4, oval to oblong-ovate, about 1.2 mm long, apiculate, the filaments and white anthers each about 1 mm long; rudiment of ovary minute: perianth-segments of pistillate flowers 3, the intermediate about 0.8 mm long, half-inclosing the ovary, the laterals half as long or more; staminodes inconspicuous; ovary obliquely ellipsoid or ovoid, about 0.6 mm long; stigma capitate-penicillate; achene gibbous, nearly smooth, about 1 mm long.

Described by the collectors as herbs or shrubs; about 30 to 40 cm high, entirely glabrous: leaves opposite, the petioles of those of a pair somewhat unequal, not exceeding 2.5 cm and usually much less, especially on the branches; lamina chartaceous or firmly membranaceous, elliptic to

oval, those of a pair equal or subequal, the cauline 5.5 to 10 cm long, 1.8 to 4.5 cm wide, those of the branches smaller, acute or obtuse at the base, the margins forming many shallow teeth, the apex forming an acumen 1.5 cm long or less: trinerved or somewhat triplinerved, the transverse veins between the costa and the nerves numerous, together with the reticulations conspicuous on at least the under surface; cystoliths few and never conspicuous on the upper surface, fairly abundant on the under, especially on the principal veins; stipules semicircular, 0.5 mm long.

Luzon, District of Bontoc, *Vanoverbergh 736, 881:* Province of Benguet, Mount Tonglon, *Bur. Sci. 5398 Ramos;* Rio Trinidad, *Bur. Sci. 5566, 5553* (type) *Ramos;* Mount Pulog, *For. Bur. 16045 Curran, Merritt, & Zschokke.* These collections are very similar in general appearance, yet it is possible that they may hereafter require segregation, as in some the perianth-segments of the pistillate flowers are very nearly equal, and these have the leaf-bases acute, the others have the perianth-segments unequal and the leaf-bases are obtuse: however, there is considerable variation in the comparative length of the perianth-segments in different flowers in the same inflorescence. The species is fairly closely allied to the next, but easily distinguished by the different texture of the smaller and shorter-petioled leaves, and the shorter inflorescences.

5. **Pilea melastomoides** Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 186.

Urtica melastomoides Poir. Suppl. 4 (1816) 223.

Luzon, District of Lepanto, Mount Data, *Merrill 4498, 4579:* Province of Benguet, Pauai, *Bur. Sci. 4412, 4456 Mearns, Bur. Sci. 8324 McGregor;* Pauai to Baguio, *Merrill 4784;* Mount Tonglon (Santo Tomas), *Elmer 6533, For. Bur. 4955 Curran:* Province of Laguna, Mount Banajao, *Bur. Sci. 9765 Robinson.*

The identification is a somewhat doubtful one, though extremely close alliance is certain. Weddell [19] says of the species under *P. trinervia* Wight, to which he reduced it, that while the peduncles of the staminate inflorescences exceed the petioles, those of the pistillate do not.. This is not true of the Philippine plants, as in both cases the petioles are shorter than the peduncles, though themselves long. Moreover, the cystoliths of the upper surface of the leaves are wanting, unless they are represented by extremely numerous points very different from the typical cystoliths of the genus, which are abundant on the under surface. The collections are quite well represented by Wight's figure [20] of *Pilea trinervia*, and by that of *P. oreophila* Miquel.[21]

Java, probably also India and Ceylon.

6. **Pilea robinsonii** Elmer Leafl. Philip. Bot. 3 (1910) 880.

Herba succulenta, glabra, caulibus 1 ad 3 m longis reclinatis: inflorescentiis pistilliferis quam petioli multo brevioribus; perianthii lobis 3, valde inaequalibus, intermedio ovarii marginem apice excepta anguste amplectente, lateralibus multo minoribus subinconspicuis, stigmate capitellato-penicillato; acheniis compresso-ovoideis, marginem versus linea granulata circumcinctis: foliis decussatim oppositis, paris petiolis

[19] DC. Prodr. 16[1] (1869) 127.
[20] Icones 6 (1853) *pl. 1973.*
[21] Fl. Ind. Bat. 1[2] (1859) *pl. 17.*

inaequilongis, 3 ad 7 cm longis, laminis subaequalibus, ovalibus vel oblongo-ellipticis, 13 ad 17 cm longis, basi acutis, margine basi excepta haud alte serratis, apice acuminatis, acumine gracile, serrato, triplinerviis, venis transversalibus admodum numerosis cum reticulationibus utraque pagina conspicuis, utraque pagina cystolithis creberrimis notatis; stipulis inconspicuis.

MINDANAO, District of Davao, Mount Apo, Todaya, *Elmer 10487, 11758*. Also closely allied to *P. melastomoides*, differing from the Philippine plants here so identified by its larger and differently shaped leaves with conspicuous cystoliths on the upper surface, and by the much shorter pistillate inflorescences; from typical *P. melastomoides*, as described by Blume,[22] by having somewhat larger and longer-petioled leaves, which are not trinerved but triplinerved. Weddell describes the leaves of *P. trinervia* as trinerved, and they are figured by Wight as such or very nearly so; in the present species they are very distinctly triplinerved.

Local name: *salimbanguin*.

7. **Pilea rigida** sp. nov.

Herba: inflorescentiis brevibus quam petioli breves brevioribus vel paulo longioribus; perianthii pistilliferi lobis valde inaequalibus: foliis decussatim oppositis, paris petiolis laminisque inaequalibus, his rigide chartaceis, ellipticis vel anguste ellipticis, basi utrinque subcordatulis, margine ima basi excepta serratis, apice acuminatis, trinerviis vel subtriplinerviis, venis transversalibus numerosis cum reticulatione utraque pagina conspicuis, cystolithis confertis, conspicuis.

Monoecious, the inflorescences not exceeding 7 mm in length, usually shorter, the peduncles very short or wanting: staminate flowers in glomerules, nearly sessile; perianth-segments 4, oval or ovate, 0.4 mm long, obtuse and often apiculate; filaments of similar length, anthers small, immature; rudimentary ovary nearly circular, small: pedicels of pistillate flowers very short at anthesis, becoming about 0.5 mm long in fruit, the intermediate perianth-lobe lanceolate, obtuse, curved, about 1 mm long, laterals ovate, acuminate, 0.4 mm long; ovary and achene gibbous, the latter smooth, nearly 1 mm long; stigma capitate-penicillate.

A glabrous herb, about 40 cm high, sparingly branched; the internodes angled when dry, ranging in length from 15 mm near the base to about 7 mm near the apex: leaves of a pair unequal both as regards lamina and petioles, the latter never exceeding 1 cm in length, the longer more often about 8 mm, the shorter about 4 mm; lamina rigidly chartaceous, elliptic or narrowly elliptic, the longer up to 5.5 cm in length and 1.8 cm in width, but more often smaller, the shorter about half the size of the corresponding longer, very shallowly cordulate on both sides at the base, the margins regularly serrate, the apex forming a slender serrate acumen; trinerved or when seen from below appearing somewhat triplinerved, the

[22] Mus. Bot. Lugd.-Bat. 2 (1856) 55.

transverse veins numerous, and together with the reticulations and cystoliths conspicuous on both surfaces; stipules about 0.5 mm long.

LUZON, Province of Nueva Vizcaya, Mount Dalemdim, at 1500 m elevation, *Bur. Sci. 8181 Ramos.* Allied to *P. luzonensis* Merr., but distinguished by its shorter internodes, and smaller, shorter-petioled, more rigid leaves.

8. **Pilea luzonensis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 48.

LUZON, Province of Bataan, Mount Mariveles, *Whitford 279, 1129, s. n.:* Province of Nueva Vizcaya, Caraballo Sur, *Merrill 227:* possibly also Province of Benguet, Baguio, *Elmer 8753;* Mount Tonglon, *For. Bur. 11101 Whitford.*

This species has great general similarity to *P. scripta* Wedd., but has very short peduncles, and the leaf-serration extends to the acumen; comparison with Indian material shows the following distinct difference in the venation. The veins from the midrib in *P. scripta* are interruptedly thickened, and at about two-thirds of the distance to the nerves are united by a somewhat definite though rather faint vein nearly parallel to the nerves: in *P. luzonensis,* the veins are of equal thickness or gradually fainter distally, there is no such connecting vein on any of the sheets cited except the very doubtful one from Mount Tonglon.

Endemic.

9. **Pilea apoensis** Elmer Leafl. Philip. Bot. 3 (1910) 882.

Planta succulenta, basi sublignosa, ramosa, glabra: inflorescentiis subcentimetralibus vel staminiferis admodum longioribus, his quam petioli admodum longioribus, pistilliferis brevioribus; floris pistilliferi perianthii lobis 3, valde inaequalibus; achenio gibboso, sparse puncticulato: foliis membranaceis paris saepius inaequimagnis, petiolis inaequilongis, usque ad 3.5 cm sed saepius, praesertim in ramis, multo brevioribus, laminis membranaceis, ellipticis vel elliptico-lanceolatis, usque ad 8 cm longis et 3 cm latis, basi acutis, trinerviis vel triplinerviis, margine serrulatis, apice breviter acuteque acuminatis; stipulis parvis.

MINDANAO, District of Davao, Mount Apo, Todaya, at 1725 m elevation, *Elmer 11551.*

Of our other species, probably most nearly related to those of the *P. melastomoides* alliance, but not at all closely.

Local name: *sogalum.*

10. **Pilea intumescens** sp. nov.

Subherbacea: inflorescentiis staminiferis brevibus, quam petioli brevioribus, femineis adhuc ignotis: foliis decussatim distichis, petiolis laminisque admodum inaequilongis, his lanceolatis vel elliptico-lanceolatis, basi acutis, apice sensim angustatis vel acuminatis, interdum falcatis, marginibus distanter serratis.

Staminate inflorescences not exceeding 2 cm in length, shorter than the corresponding petioles, the peduncles 1 cm or less, the flowers loosely glomerulate, shortly pedicellate; perianth-segments 4, elliptic or lanceolate, 1.5 to 2 mm long; filaments 2 mm long, anthers cordate, suborbicular, 1 mm long; rudiment of ovary minute.

Probably about 1 m high, the stem, in a dried state, very conspicuously

angled and annulate, the internodes swollen, about 1 to 1.5 cm long: petioles of leaves of a pair distinctly of unequal length, the lamina less conspicuously unequal, the petioles flattened, 1 to 5 cm long, the lamina lanceolate or elliptic-lanceolate, 7 to 12 cm long, 1.8 to 3 cm wide, the base acute, the margins shallowly serrate except for a varying distance from the base, gradually contracted from below or about the middle to a slender apex or barely acuminate or falcate, membranaceous, both surfaces most thickly crowded with cystoliths, the under thereby glaucous, triplinerved or almost trinerved, the veins connecting the midrib with the basal nerves usually very obscure, but on other leaves of the same plant well evident, the inferior anastomoses very inconspicuous; stipules broadly triangular, 1.5 mm long, more or less persistent.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1223*. A very distinct species, but of uncertain relationship, owing to the lack of pistillate flowers.

11. **Pilea calcicola** sp. nov.

Succulenta, tota glabra, caespitosa: monoica, inflorescentiis brevibus: petiolis inaequalibus, pro rata longiusculis, lamina membranacea, triplinervia, ovata vel late ovata, dentata, acuminata; stipulis parvis.

Monoecious; the inflorescences solitary, more often paired, rarely in threes, slightly exceeding 1 cm in length or shorter, their peduncles up to 4 mm in length or flowered to the base, pinnately branching, the flower-bearing branches more or less fascicled, both staminate and pistillate flowers borne distichously on articulated pedicels which are slightly elongated after anthesis and then about 1 mm long: perianth-segments of staminate flowers 4, oblong-lanceolate, acuminate; filaments flattened, dilated toward the base, about 1 mm long, anthers white, suborbicular, cordate and obcordate, about 0.5 mm in diameter; rudiment of ovary minute: lobes of pistillate perianth 3, unequal, the intermediate 0.75 mm long, oblong, cucullate, minutely apiculate, the laterals oval to lanceolate, 0.4 mm long, acuminate; staminodes small; ovary compressed, somewhat obliquely oval or ovate, 0.7 mm long; stigma very small, subterminal, penicillate; achene light-brown, strongly tuberculate especially in the submarginal area.

A succulent, densely cespitose plant, the internodes of variable length from 3 to 22 mm and about 3 mm in diameter at the base, glabrous throughout: petioles varying in length from 5 to 28 mm, those of leaves of a pair distinctly unequal, the lamina less definitely unequal, ovate or broadly ovate, not succulent, membranaceous when dry, 14 to 30 mm long, 11.5 to 17 mm wide, the base emarginate, rounded or greatly narrowed, the margins with usually 8 teeth, which are somewhat blunt and at least often glandular, apex acuminate, the smaller leaves rarely almost entire; triplinerved, the nerves continuing for one-half to more than two-thirds the length of the lamina, with 5 or 6 slender transverse

veins between them and the costa, these quite inconspicuous when dry; both surfaces with numerous cystoliths; stipules very short, rounded-triangular.

Luzon, Province of Rizal, Montalban, *Bur. Sci. 9529 Robinson* (type), *Phil. Pl. 51 Merrill*, on limestone cliffs, both collections made at the same time from the same clump, *Loher 6902*.

Apparently very closely allied to *P. celebica* Miq., but Miquel's description is too vague to permit very positive statement: the present species seems to have much smaller and shorter-petioled leaves, less conspicuously veined.

12. **Pilea dataensis** sp. nov.

Humilis, glabra: inflorescentiis quam petioli breves brevioribus; perianthio pistillifero haud valde inaequilobato: paris foliis inaequaliter petiolatis et inaequimagnis, laminis membranaceis, late lanceolatis vel ovatis, basi obtusis vel truncatis, margine dentatis, apice acuminatis vel subacutis, trinerviis; stipulis oblongo-lanceolatis, conspicuis.

Pistillate inflorescences not exceeding 5 mm in length, few-flowered: perianth 3-lobed, the intermediate ovate, very shortly and obtusely acuminate, about 0.7 mm long, the laterals of about equal length but wider and hardly acuminate; rudimentary stamens sessile, ovate, about 0.5 mm long; achene compressed-ovoid, nearly 1.5 mm long, densely granular-roughened.

Low plants 15 cm high or less, entirely glabrous: leaves of a pair unequal both as regards petioles and lamina, the former never exceeding 1 cm in the larger leaves or 5 mm in the smaller, lamina membranaceous, broadly lanceolate to ovate, attaining 4 cm in length and 1.5 cm in width but often smaller, the smaller of a pair about two-thirds the length of the larger, the base obtuse, rounded, or subtruncate, the margins not deeply cut into from 8 to 11 usually very obtuse teeth, the apex gradually contracted and usually forming an acumen from 2.5 to 7 mm long, trinerved or barely triplinerved, additional veins rather few, usually about 6 or 7, both these and the reticulations fairly conspicuous on both surfaces, cystoliths abundant on both surfaces; stipules oblong-lanceolate, obtuse, 3 to 5 mm long.

Luzon, District of Lepanto, Mount Data, in mossy forest at 2100 m elevation, *Merrill 4602*. Of our species, nearest to the preceding, but easily distinguished by the stipules, achenes, and in many other ways; differing from the next in the smaller size of plant and leaves, shorter stipules and petioles and other characters. Apparently a very distinct species.

13. **Pilea sylvatica** Elmer Leafl. Philip. Bot. 3 (1910) 879.

Pileae angulatae Bl. (P. stipulosae Miq.) valde affinis, sed differt inflorescentiis aliquando monoicis, stipulis adhuc longioribus (12 ad 20 mm) saepius latioribus, et acheniis tuberculatis.

Mindanao, District of Davao, Mount Apo, Todaya, *Elmer 11698, 11547*.
Local name: *sigbut-tala*.

Weddell[23] appears to refer *Urtica umbellata* Blanco to *U. umbellata* Bory, on which his own *Pilea umbellata* was based: the sign of equality comes at the extreme end of a line, and the meaning is therefore obscure. *Urtica umbellata* Blanco is not a *Pilea*, but *Laportea meyeniana* (Walp.) Warb.

5. LECANTHUS Wedd.

Lecanthus peduncularis Wedd. in DC. Prodr. **16**[1] (1869) 164, pro parte.

Procris peduncularis Wall. Cat. no. 4634; Royle Ill. Bot. Himal. (1839) *pl. 83, fig. 2*, sine descr.

Lecanthus wallichii Wedd. Ann. Sci. Nat. Bot. IV **1** (1854) 187, descr. gen. excl.; C. H. Wright in Journ. Linn. Soc. Bot. **26** (1899) 480.

Lecanthus wightii Wedd. l. c., descr. gen. excl., non C. H. Wright l. c.

Elatostema ovatum Wight Ic. **6** (1853) 11, *pl. 1985*.

LUZON, Province of Benguet, Pauai to Baguio, *Merrill 4776;* Pauai, *Bur. Sci. 4375, 4382 Mearns;* Mount Pulog, *For. Bur. 16048 Curran, Merritt & Zschokke.* MINDANAO, District of Davao, Mount Apo, *Copeland s. n., Elmer 11512.*

The more important points relating to the history of this species are as follows: *Procris peduncularis* Wall. Cat. was a nomen nudum, and some of the plants were of this genus, the others *Elatostema papillosum.*[24] Royle under the name of *Procris peduncularis* Wall. definitely figured the *Lecanthus* of the Catalogue as having the pistillate perianth equally 4-parted; there was no description, a note in the Index saying that it had been accidentally omitted. For this information, I am indebted to Mr. W. W. Smith, of Calcutta. Royle also figured *P. obtusa*, with 3-parted perianth. *Elatostema ovata* Wight, 1853, also shows the 4-parted perianth. However, in the succeeding year, Weddell in establishing the genus *Lecanthus* described it as unequally 3-parted, and in this he has been followed by all more recent monographers of the family, and by all workers except Wright, who found that there were two distinct species, with the pistillate perianth of the one equally 4-parted, of the other unequally 3-parted. Upon *E. ovatum* Wight, Weddell, in 1854, based *L. wightii, L. major* he based upon *E. oppositifolium* Dalz., *L. wallichii* was based upon the Wall. Cat. citation only, and is thus a nomen nudum. In the Monograph, Weddell included all under *L. wightii,* in the Prodromus under *L. peduncularis,* based upon *P. peduncularis* of both Wallich and Royle, with *P. obtusa* Royle and *E. ovatum* Wight cited as synonyms; with varieties *β. wallichii,* based on *L. wallichii* Wedd., and *γ. major,* based on *L. major* Wedd. and *E. oppositifolium* Wedd. The segregation of species between the forms with the unequally 3-parted and the equally 4-parted perianth was made by C. H. Wright, who adopted for the former the name *L. wightii* Wedd., citing as synonyms *L. peduncularis* Wedd. ex parte, *E. ovatum* Wight ?, *E. oppositifolium* Dalz., and *Procris obtusa* Royle; for the latter *L. wallichii* Wedd. is used, the synonyms given being *L. major* Wedd.?, *L. wightii* Hook. f. ex parte, *L. peduncularis* Wedd. ex parte, *Procris peduncularis* Wall.; Royle.

Wright's segregation of the species is here followed: his nomenclature is not: the perianth of the Philippine plants is of the equally 4-parted type.

Weddell considered *Procris peduncularis* to be published by Wallich, but even in Royle there is no description, and more common present usage would hold the name as unpublished until 1869. If considered published, it is for the species with the 4-parted perianth. The next combination is *E. oppositifolium* Dalz., who makes no reference to the perianth; from Wright's synonymy, it is the species

[23] DC. Prodr. **16**[1] (1869) 67.

[24] Hook. f. Fl. Br. Ind. **5** (1888) 569.

with the 3-parted perianth. *L. wallichii* Wedd. in the Annales is *P. peduncularis* Wall. and nothing more, why then Weddell should have subsequently separated it even as a variety from *P. peduncularis* which is it, with the addition of other supposed synonyms, may remain a mystery.

But *L. wightii* can not be used for the species with the unequally 3-parted perianth: *E. ovatum* Wight is not doubtfully a synonym of *L. wightii*, but its sole basis, and as already stated, Wight both figured and described the other type of flowers.

If *Procris peduncularis* be considered to have been published by Royle, *L. peduncularis* will stand for the species which extends to the Philippines: for the other, following the synonymy, a new combination will be necessary, based on *Procris obtusa* Royle. If not, the oldest name for the former will be obtained by a transfer of Wight's specific name: for the latter, again following synonymy, by a transfer of that of Dalzell. It is the pistillate perianth of the latter alone, which is described by Weddell, as well as in *Genera Plantarum*, *Die Natürlichen Pflanzenfamilien*, *Flora of British India*, and *Flora Indiae Batavae*.

The only foreign specimen available for comparison here is *Henry 9738 A*, from the Province of Yunnan, China: in flower and inflorescence it is an excellent match for the Philippine plants cited, but it is a much more robust plant with larger leaves. Further segregation may possibly be necessary, but it must be reserved for some one who has access to all the types. On the two-species conception, the range of *L. peduncularis* is at least India and China; the genus extends from the west coast of Africa to the Society Islands.

6. PELLIONIA Gaudich.

Polychroa Lour. Fl. Cochinch. (1790) 559, has been doubtfully reduced by Wright[25] to *Pellionia*, and the description, while not conclusive, presents no obstacles, as far as it goes. If the two prove the same, *Polychroa* is the older by 36 years: the case is not covered by the list of nomina conservanda.

KEY TO THE PHILIPPINE SPECIES OF PELLIONIA.

Inflorescences distinctly pedunculate ..... 1. *P. mindanaensis*
Inflorescences sessile or greatly condensed ..... 2. *P. sinuata*

1. Pellionia mindanaensis sp. nov.

Glabra, inflorescentiis pedunculatis, divaricato-cymosis, multifloris exceptis: perianthii pistilliferi segmentis 5, ovatis, corniculatis; staminodiis subulatis vel vetustioribus latioribus; ovario ovoideo: foliis membranaceis, valde inaequimagnis, margine saepissime grosse dentatis, apice longiter acuminatis, saepe admodum falcatis.

Dioecious or sometimes monoecious: pistillate inflorescences axillary, 4 to 8 cm long, the peduncles 1 to 2 cm long, widely branching, the flowers on short puberulent pedicels; perianth deeply 5-parted, the segments somewhat unequal, ovate, puberulent, acuminate, bearing on the dorsal surface just below the apex a spur about 1.5 mm long, the longer segments in all 2.5 to 3 mm long; staminodes 5, subulate, 0.4 mm long, but on old flowers wider and much longer; ovary ovoid, glabrous, 1.5 mm long; staminate inflorescence similar to the pistillate; perianth

[25] Journ. Linn. Soc. Bot. **26** (1899) 482.

deeply 5-parted, 2.5 mm long, the divisions oblanceolate to orbicular, their rounded apices bearing upon their dorsal surfaces spurs 0.3 mm long; stamens 5, filaments 2 mm long, anthers 1 mm long.

Glabrous, except the inflorescences, 40 cm to 3 m high; leaves with petioles up to 5 mm in length or shorter or subsessile, alternate but often with accompanying more lateral than opposite greatly reduced leaves of varying outline up to 4 mm long, the lamina of normal leaves membranaceous, variable in size and shape, lanceolate, oblong-lanceolate, elliptic-lanceolate or elliptic-oblanceolate, 3 to 24 cm long, 1 to 8 cm wide, inequilateral and usually oblique, the base acute, entire, the margin above the middle more often coarsely dentate or with the teeth reduced or wanting, the apex forming a gradually tapering straight or slightly falcate caudate acumen; lateral veins 3 to 9; both surfaces with linear cystoliths.

MINDANAO, District of Davao, Davao, *Copeland 900* (type); Mount Apo, Todaya, *Williams 2634, Elmer 10466:* Lake Lanao, Camp Keithley, *Mrs. Clemens 407, 430, s. n.*

Local name: *dadar.*

Probably more closely allied to the next than to any other previously described species.

2. **Pellionia sinuata** Boerl. Handl. Kenn. Fl. Ned. Indie 3 (1900) 375.

Procris sinuata Bl. Bijdr. (1825) 511.

Elatostema sinuatum Hassk. Cat. Hort. Bogor. Alt. (1844) 79.

Elatostema laciniatum Elmer Leafl. Philip. Bot. 1 (1908) 287.

LUZON, Province of Tayabas, *Elmer 9196;* Atimonan, *Whitford 630?.* SAMAR, Catubig River, *Merrill 5205.*

The identification is made through comparison with a sheet so named recently received from the Buitenzorg Botanical Garden, there cultivated, XI B (XIX) 30. No complete descriptions seem to have been published, the species having been placed by Weddell among those imperfectly known. The Philippine plants show great variation in leaf-size, but in all essentials seem to be quite the same.

Java, Celebes.

7. ELATOSTEMATOIDES gen. nov.

Pellioniae et Elatostemati affine; inflorescentiis haud involucratis, saepissime congestis, perianthio pistillifero alte quinquepartito, segmentis breviter vel haud acuminatis distinguendum: plantis saepe rigidis, foliis alternis vel uno difforme valde reducto oppositis.

To the extreme difficulty of limiting correctly the species of the *Elatostema* group, there is added an equally troublesome question regarding the genera. This has been definitely raised by Hallier,[26] who reached the conclusion that the three genera *Pellionia, Procris,* and *Elatostema* should be reduced to subgeneric rank under the last. He seems to confuse two quite different problems, whether there are three such genera with

[26] Ann. Jard. Buitenz. 13 (1896) 300–316, *pl. 25–27.*

well defined limits, and whether the limits assigned to them by Weddell and others are correct. He has been followed by Schumann and Lauterbach,[27] who have gone so far as to describe a species whose "Bluten sind leider nicht entwickelt." The examination of Philippine material has shown that the problem is a very real one, and the conclusion herein reached is that these three genera are unusually distinct for the family and readily recognizable almost at a glance, but that there is a group whose representatives known to Weddell were by him placed in *Elatostema,* though Hallier dealing with nearly allied species found that they traversed existing definitions and placed them in the subgenus *Pellionia,* Boerlage[28] later transferring them to the genus of that name. They are the species included in the genus here proposed as new, with additions.

Two sets of characters come into the discussion, the nature of the inflorescence, and that of the perianth of the pistillate flowers. In typical *Elatostema,* both the staminate and the pistillate flowers are inclosed in an involucre formed by bracts: in the simplest cases, this involucre consists of a single outer opposed pair, almost free from one another or united across their bases; with these alternate two other pairs; that is to say, one of these inner bracts is situated within and nearly opposite the margin of each of the two outer bracts. These four inner bracts normally incurve at their margins and divide the receptacle into four parts; bracteoles surrounding the flowers or groups of flowers are nearly always present. In more complex receptacles, the bracts become more and more united, and the number may be increased, but in the staminate, these six bracts can always be traced, in the pistillate it becomes difficult to trace more than two, or sometimes even one. The simpler arrangement of bracts is, in general, found in species with slender-peduncled receptacles, and probably indicates these as the more primitive forms.

In *Pellionia,* neither the staminate nor the pistillate flowers are in receptacles formed by bracts; in one of our species, there is a tendency, hardly more, for the pedicels to unite to form a receptacle, much as happens in the majority of our species of *Laportea,* but this is obviously a very different thing from the receptacle of *Elatostema.*

Finally, in *Procris,* the staminate flowers are in glomerules cymosely arranged, while the pistillate are upon a fleshy receptacle, exinvolucrate, or at most with a barely projecting rim. It is evident that these three genera can be positively determined from the inflorescence alone, if both sets of flowers be available, and that *Elatostema* can be distinguished by either alone: *Procris* and *Pellionia* have further a very distinct habit.

The case is strengthened when the pistillate flowers are brought into

[27] Nachtr. Fl. Deutsch. Schutzgeb. Südsee (1905) 253–255.
[28] Handl. Kenn. Fl. Ned. Ind. 3[1] (1900) 345, 346.

the discussion. In the species here placed in *Elatostema* (excepting, of course, those whose pistillate flowers are unknown), there is always a pedicel, rarely as much as 1 mm long but usually shorter, at the apex of which there is a cup-shaped perianth, with very short, rounded lobes, sometimes ciliate, but this last is a most inconstant character. Apparently these are treated by Stapf [29] as staminodes, but this interpretation would involve the presence of staminodes at the base of an ovary raised upon a common pedicel, which is quite distinct from anything else in the family. So far as appearance goes, they might well be staminodes, the lobes are in most cases about 0.1 mm long, and number 3, they are often so little defined that it is difficult to be certain of the number, which may appear to be 2 or 4; in one case it was definitely 4 in flowers from a receptacle in which others were as definitely 3. This perianth is always present, and usually merely invests the extreme base of the ovary, rarely it reaches one-third or even one-half of the length of the latter; in two species, flowers were found whose perianth appeared quite typical, but on closer inspection, it proved that the lobs were infolded and that when outspread they were nearly as long as the achene, but this was of so little importance that other flowers in the same receptacles were quite typical. Staminodes, in such flowers, must be conspicuous unless extremely minute: I have probably not found them in any species, though in a very few cases minutes spots were seen adhering to the base of the ovary: in *E. stracheyanum,* Weddell describes them as longer than the perianth.

In *Pellionia,* the pistillate perianth is 4- or 5-parted, usually about as long as the ovary but sometimes distinctly shorter, and its divisions are further terminated by a spur of similar length. This spur varies slightly in its position, even in a single flower, being usually distinctly dorsal just below the apex of the wider sepals, or separated from the apex by a minute rim, or quite terminal: it is superficially the most conspicuous thing in the flower.

In *Procris,* the perianth is so deeply parted and widely spreading that it becomes mechanically very difficult to allocate its divisions to the corresponding ovary or achene; these divisions are 3 or 4, as long as the ovary or considerably shorter than it, and always lack the spur of *Pellionia.* They can not be mistaken for those of either that genus or still less of *Elatostema*, indeed they more nearly resemble those of some species of *Pilea.* Staminodes are probably wanting.

If this were all, no generic difficulties should arise. But Weddell included in *Elatostema* a very few species, of which *E. manillense* Wedd. may be taken as typical, in which the inflorescence is often very condensed but not contained in a bract-formed receptacle, where the pistillate perianth is 5-parted, at the most very shortly acuminate, and where short

[29] Trans. Linn. Soc. Bot. II 4 (1894) 231.

staminodes are present. Field as well as herbarium experience has testified to the accuracy of this statement regarding the involucre, though the specimens so seen were immature. If these are retained in *Elatostema,* no one character is left upon which to maintain the separation of the genera. Furthermore, if *Androsyce* is kept as a subgenus instead of a genus, the best of all the characters is lost.

It is significant that in Weddell's enumeration of the species of *Elatostema* in the Prodromus, writing there with his fullest knowledge of the plants, the only species definitely recorded as having a 5-parted pistillate perianth is *E. rostratum* Miq., to which he there reduced *E. manillense* as a variety. He states that he had seen only staminate flowers of the latter: how very accurately he interpreted its alliance is shown by the fact that our sheet of *Cuming 786,* on which it was based, has pistillate flowers, and they have the inflorescence and perianth of *E. rostratum.* In other words, they have a very distinctive habit. There is little room for doubt that the very group under consideration is responsible for the exception made by Weddell in his statement of the number of perianth-divisions in *Elatostema.*

The group, which occasioned Hallier's difficulties, is similar but somewhat different, for no one of the 6 Bornean species described by him under his subgenus *Pellionia* is typical of the genus of that name. The pistillate flowers are described in 3 species as in capitula, or "subcapitatim congesti," the perianth is 5-parted: the other species are clearly in the same alliance. But these differ from the *E. manillense* group in that the staminate inflorescence is long-pedunculate, though the flowers are not collected in an involucrate receptacle. We have a similar case in *Merrill 5269,* from Bucas, an island northeast of Mindanao. The difference seems no more serious than that between the sessile and peduncled receptacles of *Elatostema,* or between the lax and the condensed cymes of different species of *Pellionia.* In these aberrant cases, the pistillate inflorescence is so condensed that it has the appearance of a receptacle, but the most ordinary care is sufficient to show that none is present.

Neither of these two groups can be placed in *Elatostema,* as they lack its two distinctive characters, though they most nearly resemble it in habit, while sufficiently distinct even in that. If existing definitions are to be followed, they more nearly go into *Pellionia,* and it may well be a matter of opinion whether the conception of that genus should be enlarged to include them, in which case they would make a distinct subgenus with two definite divisions, or whether it is better to place them by themselves. The latter course has here been followed, owing to the distinctive perianth, the greater condensation of at least the pistillate inflorescence, and the different habit.

There is another consideration of a somewhat different nature. There is much temptation to consider *Procris* the most primitive genus of the

four, with its simple pistillate perianth, absence of involucre, and its few species distributed over a wide area, these more difficult to limit specifically even than the horde belonging to *Elatostema:* but the receptacle points in the opposite direction. On the other hand, it would be no great transition for the condensed cyme of *Elatostematoides* to pass into the receptacle of *Procris,* or the looser cyme of *Pellionia,* the pistillate perianth, intermediate between that of *Procris* and of *Pellionia* might develop in either direction; from any point of view, *Elatostema* is the most distinct, but the most probable origin would be through *Procris.* Should the common ancestor of all four be now extinct or still to be discovered, then it is more probable that *Elatostematoides* lies between it and *Pelliqnia.*

The staminate flowers, as distinguished from the inflorescence, afford no characters: an unfortunate statement in the Pflanzenfamilien,[30] referred to by Hallier, that those of *Pellionia* are "3teilig," does not assist. It may well have been a typographical error: at any rate, it is not true.

While the present discussion is based chiefly upon Philippine species and the descriptions of those of other countries, the courtesy of the Director of Agriculture, Buitenzorg, has enabled me to examine specimens of 5 of the 6 Bornean species to which reference has been made.

The type of *Elatostematoides* is *Elatostema manillense* Wedd.

KEY TO THE PHILIPPINE SPECIES OF ELATOSTEMATOIDES.

Staminate inflorescences sessile or shortly pedunculate.
  Strongest nerve of at least the narrower side of leaves inserted well above base.
    Leaves large, at least 12 cm long ..... 1. *E. manillense*
    Leaves small, not exceeding 10 cm ..... 2. *E. mindanaense*
  Strongest leaf-nerves basal or subbasal.
    Leaves 2.5 to 5 cm wide ..... 3. *E. laxum*
    Leaves not exceeding 2 cm in width ..... 4. *E. rigidum*
Staminate inflorescences on long slender peduncles ..... 5. *E. gracilipes*

1. **Elatostematoides manillense** (Wedd.) comb. nov.

Elatostema manillense Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 189.

Elatostema rostratum var. *manillense* Wedd. in DC. Prodr. 16[1] (1869) 179.

Luzon, Province of Cagayan, Pamplona, *Bur. Sci. 7495 Ramos:* Province of Tayabas, *Cuming 786;* Infanta, *Bur. Sci. 9345 Robinson.* Polillo, San Francisco, *Bur. Sci. 6942, 6943 Robinson.* Panay, Dumarao, *Merrill 6710.* Mindanao, Province of Misamis, Bliss River, *For. Bur. 4698 Mearns & Hutchinson:* Subprovince of Butuan, Waloe, *Merrill 7283.* It is hardly too much to say that no one of our collections referred to this genus is an exact match for any of the others, the specimens cited for this species differing in the extent of the pubescence, and more or less in the shape and serration of the leaves, the Mindanao plant being the most distinct. The character used in the key, taken from the venation, seems natural, and at once separates the species from *E. rostratum.*

Elatostema polioneurum Hallier f. is a very close ally of this species, differing

[30] 3[1]: 108.

from some of the collections here cited less than they differ from one another. If the present disposition of the Philippine plants were considered final, the Celebes species would be cited as a synonym: but for the venation, its resemblance to *E. laxum* is equally great.

2. **Elatostematoides mindanaense** sp. nov.

Inflorescentiis staminiferis brevibus, cymoso-paniculatis, pistilliferis exinvolucratis, sessilibus, perianthio 5-partito ovarium paullo superante: foliis oblique oblanceolatis vel elliptico-oblanceolatis, basi inaequilatera acutis vel subobtusis, margine serratis, apice longiter acuminatis.

Staminate inflorescences axillary, less than 1 cm long, cymose-paniculate, shortly peduncled, the pedicels about 2 mm long; perianth-segments oblong-oblanceolate, 2 mm long, obtusely and shortly acuminate, ciliate; the filaments slightly longer, the anthers 1 mm long: pistillate inflorescences axillary, often crowded, exinvolucrate, simulating a receptacle, 2 to 3.5 mm in diameter; the flowers on pedicels about 1 mm long; perianth deeply 5-parted, the segments broadly oblanceolate, 0.7 to 0.8 mm long, barely acuminate or corniculate, pilose and somewhat densely ciliate; staminodes present but minute; ovary compressed-ovoid, slightly shorter than the perianth; achenes tuberculate; stigma small, penicillate.

Plants somewhat rigid, 13 to 40 cm high, simple or somewhat branched, the stems somewhat densely pubescent especially at the apex: leaves alternate, the petioles 1 to 3 mm long, the lamina obliquely oblanceolate or elliptic-oblanceolate, 3.5 to 10 cm long, 6 to 25 mm wide, chartaceous or firmly membranaceous, the base inequilateral, one side usually produced beyond the other, acute or subobtuse, the margins dentate except at the base, the apex forming a slender dentate acumen 5 to 20 mm long; main nerve of the wider side arising about 1 mm from the base and only obscurely connected with the succeeding 4 or 5 veins the lowest of which are equally prominent; main nerve of narrower side arising 5 to 10 mm from the base and continued into the acumen, with a much fainter subbasal nerve which forms frequent connections with it; under surface pubescent at least on the veins, upper glabrous, both with numerous cystoliths; stipules 4 to 7 mm long, linear-lanceolate, very acutely acuminate.

MINDANAO, District of Davao, Catalonan, *Copeland 935* (staminate), *936* (pistillate, type). The staminate plants are larger with larger leaves.

3. **Elatostematoides laxum** (Elmer) comb. nov.

Elatostema laxum Elmer Leafl. Philip. Bot. 2 (1908) 465.

Inflorescentiis haud involucratis; staminiferis brevibus; pistilliferis globosis, sessilibus sed haud receptaculum efformantibus, floribus pedicellatis, bracteatis, perianthio alte 5-partito, segmentis lanceolatis vel oblanceolatis, usque ad 1 mm longis, non vel brevissime acuminatis, apice aliquando ciliatis, ovario subaequalibus, staminodiis minutis, stigmate penicillato: foliis alternis, oblique lanceolatis vel ovatis, basi obtusis vel

uno latere acutis, margine basi vel usque ad medium excepta dentatis vel serratis, apice longiuscule et subfalcatim acuminatis, e basi trinerviis.

NEGROS, Province of Negros Oriental, Cuernos Mountains, *Elmer 10337* (type collection): Province of Negros Occidental, Himugaan River, *Whitford 1584*. LEYTE, Palo, *Elmer 7270*. Neither of the other collections is a perfect match for the type.

This, on vegetative characters, is very close to *Elatostema mesargyreum* Hallier f., as represented by a sheet of the type collection, the only notable distinction being the presence of very greatly reduced subopposed leaves on the Bornean plant. It is pistillate, and as only the staminate inflorescence and flowers were described by Hallier, it is worth stating that the pistillate are quite as here described for *Elatostematoides*. Both of the Philippine collections, other than the type, are staminate: the inflorescence is a condensed cyme, very different from that described and figured by Hallier for *E. mesargyreum*.

The alliances are very accurately stated in the original description, as it is more closely allied to *Elatostema rostratum* Miq. than to the other Philippine species. Comparison with Javan material shows it to differ in the much coarser reticulation of the less numerously toothed leaves.

4. **Elatostematoides rigidum** (Wedd.) comb. nov.

Elatostema rigidum Wedd. in Arch. Mus. Paris 9 (1856) 320.

SAMAR, *Cuming 1674*. NEGROS, Province of Negros Occidental, Himugaan River, *Whitford 1655*. Cuming's specimen having been staminate, it should be added that the pistillate inflorescences are sessile, exinvolucrate, the perianth 5-parted, not mucronate, but ciliate, exceeding the ovary, and that staminoles are present. The Negros collections are an excellent match for the cotype.

5. **Elatostematoides gracilipes** sp. nov.

Inflorescentiis staminiferis in pedunculis longiusculis gracilibusque suffultis, aliquando parce ramosis, glomerulis parvis, paucifloris, exinvolucratis; inflorescentiis pistilliferis sessilibus, parvis, exinvolucratis, perianthio alte 5-partito, achenio subaequali: foliis alternis, firmiter membranaceis, lanceolatis ad oblanceolatis, basi obtusis vel uno latere acutis, margine supra medium dentatis, apice acuminatis.

Staminate inflorescences on slender pubescent peduncles usually 15 to 25 mm long, usually bifurcate and sometimes further divided, the glomerules up to 3 mm in diameter, bracted at the base but not truly involucrate, pedicels short, bearing a whorl of bracts below the flowers: perianth-segments 5, oblong-ovate, 0.8 mm long, ciliate: pistillate inflorescences sessile, greatly condensed but not forming a receptacle, exinvolucrate; perianth deeply 5-parted, the segments linear-lanceolate, 0.8 mm long, barely acuminate but with a tuft of cilia at the apex; staminodes minute; ovary compressed, ovoid, nearly as long as the perianth; stigma short, penicillate.

Suffrutescent, about 50 cm high, the stems distinctly woody, widely branching, especially toward the apices densely pubescent: leaves alternate, subsessile, the lamina membranaceous but firm, lanceolate to oblanceolate, sometimes broadly, 2 to 4 cm long, 8 to 13 mm wide, rarely opposed by

similar but greatly reduced leaves, obtuse or sometimes on one side acute at the inequilateral base, the margins above the middle shallowly serrate or dentate, the apex forming an obtuse mucronate acumen; upper surface glabrous but with conspicuous cystoliths, the under densely fulvous-pubescent on the veins with less conspicuous cystoliths; main nerve of the narrower side arising about 5 mm from the base, of the wider about 1 mm from the further-produced base; stipules acicular from a triangular-ovate base, in all about 6 mm long.

Bucas, on cliffs in semi-shaded ravines at 15 m elevation, *Merrill 5269*. Allied to the Bornean species, as already indicated, but not at all to be confused with any of them.

The following extra-Philippine species are referable to this genus.

1. **Elatostematoides thibaudiaefolium** (Wedd.) comb. nov.

Elatostema thibaudiaefolium Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 188.
Elatostema rostratum Miq. in Zoll. Syst. Verzeichn. (1854–1855) 102, non Hassk. Cat. Hort. Bogor. Alt. (1844) 79.

The synonymy follows both Weddell and Miquel,[31] each accepting the other's name in preference to his own. The ruling of the Vienna Congress that an older name has to be valid in order to preclude its later use, would introduce additional complications. Again following both Weddell and Miquel, *Elatostema rostratum* Hassk. is the same as *Procris rostrata* Reinw. ex Blume Bijdr. (1825) 510, which they both reduce to *Pellionia elatostemoides* Gaudich. Freyc. Voy. Bot. (1826) *pl. 119*. If the reduction is correct, Blume's name is the oldest for that species, but whereas he cites Javan localities only, Miquel credits the species to the Moluccas only, while Weddell also omitting Java though saying that he had seen the species in Mus. Lugd.-Bat., ascribes the plant to the Moluccas, New Guinea, Fiji, and the Marquesas. A reëxamination of the collections is necessary before displacing Gaudichaud's name.

2. **Elatostematoides pictum** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *pictum* Hallier f. Ann. Jard. Buitenz. **13** (1896) 300.
Pellionia picta Boerl. Handl. Kenn. Fl. Ned. Ind. 3 [1] (1900) 375.

3. **Elatostematoides robustum** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *robustum* Hallier f. l. c. 302, *pl. 25, fig. 2.*
Pellionia robusta Boerl. l. c.

4. **Elatostematoides vittatum** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *vittatum* Hallier f. l. c. 303, *pl. 26, fig. 1.*
Pellionia vittata Boerl. l. c.

5. **Elatostematoides insigne** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *insigne* Hallier f. l. c. 304, *pl. 26, fig. 2.*
Pellionia insignis Boerl. l. c.

6. **Elatostematoides mesargyreum** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *mesargyreum* Hallier f. l. c. 305, *pl. 27, fig. 2.*
Pellionia mesargyrea Boerl. l. c.

[31] Fl. Ind.. Bat. 1[2] (1859) 242.

7. **Elatostematoides falcatum** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *falcatum* Hallier f. l. c. 305.
Pellionia falcata Boerl. l. c.

8. **Elatostematoides machaerophyllum** (Hallier f.) comb. nov.

Elatostema (*Pellionia*) *machaerophyllum* Hallier f. in Bull. Herb. Boiss. 6 (1898) 355.
Pellionia machaerophylla Boerl. l. c.

9. **Elatostema polioneurum** Hallier f. ex Koord. in Meded.'s Lands. Plant. 19 (1898) 595; Boerl. Handl. Kenn. Fl. Ned Ind. 3[1] (1900) 375, nomen nudum.

No new combination is here proposed, both because the species does not seem to have been described, and because of its close alliance to *E. manillense*, under which it is briefly discussed. The statements here are not based on Hallier's type, but on a collection by Teysmann, from Amboina, which the Director of Agriculture, Buitenzorg, has kindly permitted me to inspect.

8. PROCRIS Commers. ex Juss.

KEY TO THE PHILIPPINE SPECIES OF PROCRIS.

Leaf-venation very obscure, except the conspicuous costa.
Receptacles about 5 mm in diameter; leaves rarely as much as 2 cm wide. 1. *P. philippinensis*
Receptacles 7 to 15 mm diameter; leaves wider..... 2. *P. lagunensis*
Leaves conspicuously 6- to 11-veined.
Stems woody at base; leaves 10 to over 20 cm long, their margins entire or merely undulate; pistillate receptacles sessile..... 3. *P. pseudostrigosa*
Stems succulent; leaves usually shorter, their margins distinctly crenate. 4. *P. crenata*

1. **Procris philippinensis** sp. nov.

Procris laevigata Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 49, non Bl. Bijdr. (1825) 508.

Glomerulis staminiferis pedunculatis; capitulis pistilliferis sessilibus, solitariis: foliis oblique lanceolatis vel anguste oblongo-lanceolatis, basi acutis vel uno latere obtusis, venis utrinque costa excepta inconspicuis.

Staminate inflorescences 6 to 30 mm long, the slender peduncles up to 2 cm long, sparingly branched, few-flowered, the flowers very shortly pedicelled; perianth-segments 5, oblong to ovate, 2.5 mm long, obtuse; filaments equally long, inflexed, anthers 1 mm long, cordate: pistillate inflorescences sessile, solitary, when dry about 5 mm in diameter, the flowers very numerous, sessile, bracted; perianth 3-parted to the very base, the sepals obovate, contracted below into a claw, obtuse, very shortly acuminate, nearly as long as the achene; achene obovoid, 1.2 mm long, tuberculate; stigma short, subterminal.

Erect or scandent on trees, glabrous, stems succulent, 30 to 80 mm long, the internodes in the leaf-bearing part about 1 cm long, often distinctly zigzag: larger leaves with petioles 2 to 8 mm long, the lamina succulent but drying membranaceous or chartaceous, 4 to 9 cm long, 6 to 22 mm wide, obliquely narrowly lanceolate, oblong-lanceolate or

oblanceolate, acute or sometimes on one side obtuse at the usually distinctly inequilateral base, the margins entire or more rarely toothed near the apex, which is contracted into a slender or only comparatively wide obtuse falcate acumen up to 2 cm long; smaller leaves often present and opposite or nearly opposite the larger, narrowly elliptic or elliptic-lanceolate, 2 to 4 mm long; costa distinct, especially on the under surface, mature leaves at the most barely showing the lateral veins; both surfaces with cystoliths; stipules short, triangular, obtuse.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3884* (type). POLILLO, Aluyon, *Bur. Sci. 9246 Robinson*. The first grew erect on cliffs at an elevation of 1000 m, the second was scandent, but almost at sea-level. The species seems quite distinct from *P. laevigata* in its sessile and solitary pistillate inflorescences, as well as by the obscure leaf-venation.

2. **Procris lagunensis** sp. nov.

Praecedenti similis, sed differt capitulis pistilliferis multo majoribus, usque ad 15 mm diametro et foliis oblongo-ellipticis, saepius latioribus.

Staminate inflorescences similar to those of the preceding species: the pistillate sessile, solitary, 7 to 15 mm in diameter when dry, the flowers very numerous, sessile; perianth parted almost to the base, the segments 4, oblong-lanceolate, about 0.7 mm long; achenes about 1 mm long, obovoid, hardly compressed; stigma short.

Plants glabrous, scandent on tree, the upper internodes strongly zigzag: petioles 3 to 6 mm long, the succulent lamina oblong-elliptic or oblong-lanceolate, 6 to 11 cm long, 21 to 38 mm wide, acute on both sides of the inequilateral base, the margins entire, the apical acumen obtuse and less than 1 cm long; lateral veins at most barely visible, perhaps 6 to 8 pairs.

LUZON, Province of Laguna, Mount Maquiling, at an elevation of 200 m, *Bur. Sci. 9687* (*type*), *Bur. Sci. 9718 Robinson*, gathered a few weeks apart from different plants epiphytic upon the same tree; these will be further duplicated by collections of students of the Philippine Agricultural College, made on the same occasions. Closely allied to the last, from which it may prove not to be separate.

3. **Procris pseudostrigosa** Elmer Leafl. Philip. Bot. 1 (1908) 284.

Arbuscula, saepe epiphytica, glabra: inflorescentiis staminiferis 4 ad 10 cm longis, cymoso-paniculatis; capitulis pistilliferis sessilibus, multifloris, perianthii segmentis 4, fere usque ad basin liberis, oblanceolatis, circiter 1 mm long, ovarium subaequantibus: foliis modice petiolatis, oblongis ad oblanceolatis, basi inaequilatera acutis vel subobtusis, apice acuminatis, venis utrinque 7 ad 11.

LUZON, Province of Laguna, San Antonio, *Bur. Sci. 10949 Ramos:* Province of Tayabas, Lucban, *Elmer 7500* (type collection). NEGROS, Canlaon Volcano, *Merrill 6910*. MINDANAO, District of Davao, Mount Apo, *Elmer 10746:* Lake Lanao, Camp Keithley, *Mrs. Clemens 330, s. n.*, (possibly) *744:* Subprovince of Butuan, Waloe, *Merrill 7284*. The type, which was staminate, is well matched by the Apo and some of the Lanao specimens, which are both staminate and

pistillate. Others of the Lanao collections are less typical. The species is allied to *P. pedunculata* (Forst.) Wedd., but seems to differ from it in several characters. *Teysmann 13980,* from Papepekong Bonthain, Celebes, bearing a name of Hallier's, which does not seem to have been published, is very similar to this, differing so far as the material affords means of comparison chiefly by somewhat smaller leaves. The Butuan plants have the leaf-veins up to 17 in number and conspicuous stipules, but otherwise agree well with the type.

4. **Procris crenata** sp. nov.

Tota glabra, caule succulento, tumefacto: receptaculis pistilliferis pedunculatis; perianthio admodum inaequaliter trilobo: foliis submembranaceis, ellipticis vel anguste oblongis, basi obtusis, apice acuminatis, margine crenatis, venis utrinque 6 ad 8.

Pistillate inflorescences solitary or in fascicles of 2 to 4, the peduncles when mature up to 6 mm long, when dried 0.5 to 2.5 mm in diameter, the receptacles about 4 mm in diameter, rather many-flowered, not surrounded by bracts but with bracts among the flowers; perianth somewhat unequal, one lobe suborbicular, about 0.3 mm long, the other two ovate, rather shorter; achene about 1 mm long, broadly elliptic to ovate in outline, tuberculate.

Plants from less than 20 cm to over 45 cm high, the stem very succulent and swollen, when dried 3.5 to 7 mm wide: leaves alternate, the petioles 3 to 5 mm long, the dried lamina submembranaceous, elliptic, elliptic-lanceolate, or narrowly oblong, 4.5 to 15 cm long, 8 to 45 mm wide, distinctly or only slightly inequilateral at the base, the margins crenate, the crenations about as many as the veins, the apex contracted into an acumen, usually obtuse, about 7 to 10 mm long; lateral veins on each side of the midrib 6 to 8, conspicuous, other venation inconspicuous except for a few veins nearly parallel to the primary ones.

Luzon, District of Bontoc, Bauco, at 1400 m elevation, *Vanoverbergh 635* (three collections). The species seems very distinct, more nearly allied to *P. pseudostrigosa* Elmer than to any of our others, but differing from it in almost every character not of generic importance except the venation. The receptacles have even a superficial resemblance to those of *Leucosyke*, the perianth is remarkably short for the genus, resembling that of *Pilea*.

SPECIES EXCLUSAE.

1. Procris erecta Blanco Fl. Filip. (1837) 707.
Conocephalus erectus F.-Villar Noviss. App. (1880) 203.
Procris grandis Wedd. in Arch. Mus. Paris 9 (1856) 337.
Conocephalus grandifolius Warb. in Perk. Fragm. Fl. Philip. (1904) 167.

Even from the description, it is sufficiently clear that Blanco's species is a *Conocephalus*, the local name cited makes it certain. Villar's transfer, the name not being preoccupied, must stand unless the species be found synomymous with one of older date. The difficulty is to positively identify it; but the only notable obstacle I can find to the above disposition is that Blanco says that the leaves are villose on both surfaces. This is not true of herbarium specimens here, though some are pubescent on the under surface. But there are so many points of

agreement, that until *Conocephalus* is very critically studied, *Conocephalus grandifolius* Warb. may be held to represent *C. erectus* (Blanco) F.-Villar.

Procris grandis Wedd. was based on *Cuming 1730*, from Samar, but wrongly localized as from New Guinea until Rolfe's correction:[32] the specimens were staminate. Both from the description, and from the comparisons made at Kew by Mr. Merrill, it has been very strongly suspected of being a *Conocephalus*, and this opinion has been confirmed by a recent examination of the type, made at Kew, though no opinion is expressed on the reductions here suggested, owing to the lack in that herbarium of type material of the other species.

2. PROCRIS VIOLACEA Blanco Fl. Filip. (1837) 706.
Conocephalus violaceus Merr. in (Philip.) Bur. Govt. Lab. Publ. **27** (1905) 80.
C. ovatus Trécul in Ann. Sci. Nat. Bot. III **8** (1847) 88.
C. suaveolens F.-Vill. Noviss. App. (1880) 203, non Blume Bijdr. (1825) 484.
The second name should stand for this species.

9. ELATOSTEMA Forst.

The original generic description of *Elatostema* apparently was drawn, according to the statement of the authors themselves,[33] from one plant, and the genus was placed in Monoecia Pentandria. They describe or perhaps rather indicate, at least they name two species. The first is *Elatostema pedunculatum*, the second *E. sessile*, and the only distinction given, apart from that contained in the specific names, is that the former is pentandrous, the latter tetrandrous. By all authors of the last half-century and more, the former is regarded as a *Procris*, the latter has only too much history in *Elatostema* as now understood. The generic description, "Cor. quinquepartita . . . Stam. Filamenta quinque," unfortunately leaves no doubt as to which of the two must be considered the type of the genus. The figure of the staminate flower shows it as pentamerous: those of the pistillate flowers are quite inconclusive, being correct for the ovary of either *Procris* or *Elatostema*, but showing no perianth, which both possess; the figure of the flowering pistillate receptacle is perhaps better for *Elatostema*, that of the fruiting is surely taken from the *Procris*. The name, drawn from the elastic stamens, would be appropriate for either. On any logical interpretation of generic types, *Elatostema* is typified by *Procris pedunculata* (Forst.) Wedd., which would necessitate a transfer of the comparatively few species of *Procris* to *Elatostema*, while for the genus now known under the later name it would be necessary to take up *Langevaldia* Gaudich. The generic names are here retained according to traditional usage.

Some notes as to the characters of specific importance in the genus may be useful, the limits having previously been discussed under *Elatostematoides*. Historically, venation has probably played the most important part, and there can be no doubt of its value. The great difficulty in its use is the extent to which it may vary upon the same plant, never

[32] Journ. Bot. **23** (1885) 215; Journ. Linn. Soc. Bot. **22** (1886) 229.
[33] Forster, J. R. & G. Char. Gen. Pl. (1776) 105, 106, *pl. 53*.

essentially, but in such a way as to make it an extremely difficult thing to describe in exact terms, and with rare exceptions it is quite unsuited to the requirements of a key. It is probable that the final ultimate line of separation will be made on the nature of the staminate receptacles. These show a gradual increase in complexity, with increasing coalescence, but have a definite typical structure, which it is often difficult to follow in the more complicated species, but which seems always to be present. This is the presence of an outer pair of opposed bracts, each having at each margin and interior to them another bract, the latter more often infolded and inclosing the flowers: in addition to these 6 outer bracts there may be and in the majority of cases are others. As regards the peduncles, the evidence of Philippine species is that they furnish good characters, but have to be handled with discretion. One type possesses very slender peduncles of varying length, but usually comparatively long: in other cases some of the receptacles are sessile with others on the same plant shortly peduncled. In the latter cases, the explanation is often merely that of age, in others the difference is real, but such peduncles are usually comparatively stout, due no doubt to the fact that the plants or at least the receptacles are of large or more than average size. The fact that one plant has peduncled staminate receptacles while another otherwise alike has sessile pistillate ones, is of no distinctive value at all: about half of our species have peduncles to the staminate receptacles, while they are found for the pistillate in only a very few species.

The bracts of the receptacles are nearly always more or less keeled, rarely almost forming a wing: this keel in a majority of cases becomes free at or below the apex of the bract, and the free portion may protrude well beyond the apex of the bract itself. This is often a very striking character in the field, but is more difficult to use in the herbarium, and is open to two qualifications. It is not unusual for the outer bracts to be very definitely corniculate, and the inner to show this to a much less extent: and the great difficulty is with the species where short spurs are present but hardly extend beyond the general outline of the bract. Again, it is in the staminate receptacles that this is best shown. The flowers seem valueless, except that the pistillate indicate the genus with precision. The staminate develop successively, accordingly in even the fewest-flowered receptacles, it is often possible to find one on a long pedicel, one or two more subsessile and smaller, others minute. The pistillate are practically monotypic, except that the achenes often develop striae, but these may not be shown by ovaries from the same receptacle. The presence of the two kinds of receptacles on the same or different plants is of no systematic value: it is possible to look over hundreds of plants of a species with only one kind, then to find others with both. Statements in the text should be interpreted in this light. Some species of which

many individuals have been collected have only one kind, but it is probable that every species may be both monoecious and dioecious. In one case, both kinds of flowers were found in one receptacle, but this was not even true of other receptacles on the same plant: a few species are known with both kinds of receptacles at the same node, in the only case of this seen in Philippine plants, the next nodes had one kind only. The terminal acumen is regularly used and although it is often possible to find on the same plant some leaves where it is well developed and others whose apices are nearly obtuse, it is often useful. The serrations in a great majority of species vary on the same leaf, the lower being very acute, the upper various: yet they are very useful in separating species by the eye: the stipules are very useful, but are deciduous in many species; the cystoliths are often but not always very characteristic. The following key, intended partly as an aid to field-study and partly to indicate the real differences between the species, has been framed in part on somewhat artificial characters: these have not been used except when they seemed to separate species otherwise distinct. In citing affinities, the difficulty is to determine from description which characters are of greater importance.

KEY TO THE PHILIPPINE SPECIES OF ELATOSTEMA.

1. Staminate receptacles borne on slender peduncles, unknown in *E. obovatum* and *E. variabile*, at least their outer bracts corniculate, or in *E. glaucescens* and *E. delicatulum* distinctly acuminate, in *E. carinoi* not corniculate.
   2. Plants erect or creeping only at base; leaves medium-sized, only smaller leaves of a plant or leaves of reduced plants as short as 4 cm, usually 7 to 10 cm long, or even more.
      3. Staminate bracts corniculate.
         4. Stems entirely glabrous.
            5. Leaves ovate to obovate..... 1. *E. luzonense*
            5. Leaves narrowly oblong or oblong-lanceolate..... 2. *E. variabile*
         4. Stems pubescent.
            5. Apical leaf-tooth lanceolate or ovate, forming a distinct acumen, basal auricle short, not overlapping stem..... 9. *E. simulans*
            5. Apical tooth triangular or much wider than long, hardly or not extending beyond general leaf-outline; basal auricle wide, overlapping stem ..... 10. *E. obovatum*
      3. Staminate bracts not corniculate..... 28. *E. carinoi*
   2. Creeping plants.
      3. Leaves medium-sized, 7 to 11 cm long..... 3. *E. longipedunculatum*
      3. Leaves small, only occasionally as much as 4.5 cm long, never caudate-acuminate.
         4. Stems retrorsely spinulose or tuberculate; venation pinnate. 4. *E. pinnatinervium*
         4. Stems glabrous or obscurely retrorsely pilose; leaves triplinerved.
            5. Leaves oblanceolate to obovate..... 5. *E. filicaule*
            5. Leaves lanceolate to ovate..... 6. *E. inaequifolium*
         4. Stems antrorsely pilose or setose; leaves triplinerved, except partly in *E. heterophyllum* and *E. cheirophyllum*.

5. Upper surface of leaves with numerous evident cystoliths.
6. Stems rather densely pubescent; upper surface of leaf channeled by principal veins; stipules lanceolate, aciculate.. 7. *E. heterophyllum*
6. Stems less densely pubescent; leaf-surfaces plane; stipules oblong to oblong-lanceolate, obtuse or apiculate..... 8. *E. cheirophyllum*
5. Upper surface of leaves destitute of conspicuous cystoliths.
6. Staminate receptacles rather few-flowered, bracts with slender acumens; leaf-serrations very obtuse..... 11. *E. delicatulum*
6. Staminate receptacles often many-flowered, bracts with rather short thick acumens; leaf-serrations acute or subacute 12. *E. glaucescens*

1. Staminate receptacles sessile or on short stout peduncles, unknown in several species; pistillate receptacles sessile or subsessile, except in *E. whitfordii*.
2. Plants weak, creeping.
3. Stems glabrous ..... 13. *E. pulchellum*
3. At least the apex of the stem pubescent.
4. Leaves 4- to 6-plinerved, lower side strongly auricled at base, very slightly or not overlaping costa; vein-anastomoses frequent, conspicuous on upper surface..... 14. *E. acrophilum*
4. Leaves triplinerved, both sides acute at base or lower slightly auricled; anastomoses inconspicuous or wanting.
5. Serrations small, 2 to 5 on a side, only the very smallest leaves entire or 1-toothed ..... 15. *E. microphyllum*
5. Leaves entire or with a single subapical tooth on one or both sides. 16. *E. oblanceolatum*
4. Leaves quite or almost penninerved, one side of base acute, other rounded, whole margin more numerously serrate..... 17. *E. philippinense*
4. Base of wider side of leaf obliquely projecting across petiole and semi-hastate toward narrower side ..... 18. *E. hastatum*

2. Plants erect or suberect, stems usually more or less succulent, never woody.
3. Outer bracts of staminate receptacles distinctly corniculate, spurs projecting well beyond outline of bract.
4. Plants unarmed; leaves gradually contracted into a slender acumen.
5. Leaves very definitely triplinerved.
6. Stems glabrous.
7. Stipules linear-lanceolate, very acute, 4 to 7 mm long. 19. *E. viridescens*
7. Stipules broader and less acute, 10 to 15 mm long. 20. *E. banahaense*
6. Stem-apex and leaves pubescent or even scabrous.
7. Stipules lanceolate, over 1 cm long.
8. Leaf-teeth acute, crowded..... 21. *E. palawanense*
8. Leaf-teeth coarser, spreading, more widely separated. 22. *E. lagunense*
7. Stipules 3 to 5 mm long..... 23. *E. lanaense*
5. Leaves almost or quite penninerved.
6. Cystoliths minute, inconspicuous except on veins of upper surface; whole leaf-margin with fairly deep obtuse teeth. 17. *E. philippinense*
6. Cystoliths linear, conspicuous but hardly crowded, serrations shallower, more acute, wanting at base..... 24. *E. scriptum*
4. Stems, margins and veins of under surface of leaves with abundant stingless bristles; leaves abruptly acuminate..... 25. *E. spinulosum*

3. Outer bracts of staminate receptacles not or very slightly corniculate.
4. Leaves pinnately veined; pistillate receptacles peduncled.
26. *E. whitfordii*
4. Leaves triplinerved; pistillate receptacles sessile or subsessile.
5. Leaves distinctly acuminate.
6. Stems glabrous or somewhat pilose at the apex.
7. Stipules large, at least 4 mm long, often much more.
8. Basal leaf-auricle very strongly developed..... 27. *E. edule*
8. Basal auricle not or not strongly developed..... 28. *E. carinoi*
7. Stipules inconspicuous, 1.5 to 2.5 mm long..... 29. *E. angustatum*
6. Stems densely pubescent, at least at the apex.
7. Mature leaves chartaceous or subchartaceous; teeth on wider side rarely as many as 15.
8. Upper leaves usually greatly narrowed; stipules persistent.
30. *E. apoense*
8. Upper leaves similar to rest; stipules less persistent.
31. *E. longifolium*
7. Mature leaves membranaceous; marginal teeth more numerous.
8. Stem-pubescence retrorse ..... 32. *E. plumbeum*
8. Stem-pubescence antrorse ..... 33. *E. contiguum*
5. Leaves not or barely acuminate; stems pubescent.
6. Leaves not variegated, upper surface with crowded cystoliths.
7. Venation coarser, on wider side usually continuous, marginal teeth about 20..... 34. *E. obtusiusculum*
7. Venation delicate, usually not continuous, marginal teeth usually 10 or less..... 35. *E. brongniartianum*
6. Leaves variegated; upper surface with scattered cystoliths or none.
36. *E. variegatum*
2. Plants erect, the stems woody or nearly so.
3. Terminal leaf-tooth short, merely continuing the general outline of the leaf-apex.
4. Leaf serrate nearly to the narrowed base, teeth on wider side usually 8 or 9..... 37. *E. benguetense*
4. Leaf-teeth above middle, none to 4 on the wider side, which is not contracted at base ..... 38. *E. podophyllum*
3. Leaves distinctly acuminate.
4. Stipules not exceeding 4 mm long.
5. Pubescence of stem and veins of under surface of leaves appressed; marginal teeth almost always 2..... 39. *E. halconense*
5. Pubescence longer and more spreading; teeth more numerous.
6. Veins of wider side 3 or 4, teeth 5 or 6, rarely found below middle of leaf ..... 40. *E. sublignosum*
6. Veins of wider side 5 or 6, teeth 9 to 14, extending below middle of leaf ..... 41. *E. baruringense*
4. Stipules at least 7 mm long..... 42. *E. integrifolium*
1. Staminate receptacles on long basal or subbasal peduncles..... 43. *E. scapigerum*

1. **Elatostema luzonense** sp. nov.

Receptaculis staminiferis graciliter pedunculatis, bracteis corniculatis, floribus tetrameris: receptaculis pistilliferis pedunculatis vel sessilibus: foliis siccis membranaceis, lanceolatis ad obovatis, basi acutis ad rotun-

datis, margine tertia inferiore parte excepta dentatis, apice breviter vel mediocriter acuminatis.

Staminate receptacles on slender peduncles usually about 15 mm but up to 56 mm in length, the receptacles up to about 8 mm in diameter but usually smaller: outer pair of bracts semicircular, free from one another except at the base, distinctly corniculate, 3 to 4 mm long, glabrous or more or less short-pilose, the next pairs shorter and less corniculate, suborbicular; bracteoles linear-oblanceolate, pedicels varying with age, the flowers when fully mature exserted; perianth very deeply 4-parted, the segments ovate to lanceolate, about 2 mm long; filaments of equal length, the anthers about 1 mm long: pistillate receptacles sessile or on short peduncles, solitary, paired, or even fascicled, oblong to orbicular in outline, up to 8 mm in their greatest diameter, the outer bracts similar to those of the staminate but strongly fused with one another and the inner, being free only at the corniculate apex, inner lanceolate; bracteoles oblanceolate, ciliate; flowers shortly pedicelled; perianth about 0.1 mm long, with 3 rounded lobes; achene about 0.7 mm long, brown, longitudinally striate; stigma penicillate.

Erect, except at the base, the stems single or especially in somewhat drier situations tufted, simple or much less often branching, 10 to 50 cm high, glabrous but marked with cystoliths: leaves alternate or very rarely opposed by others greatly reduced, the dried lamina membranaceous, lanceolate to obovate, the size and probably somewhat the outline varying according to the habitat, the upper nearly always much larger than the lower, from 1 to 9 cm long, 7 to 33 wide, most often near the average of these figures, also with some still smaller, the base inequilateral, on the broader side rounded or subauriculate, on the narrower acute to subobtuse, the margins except in the basal third or less on the wider and farther on the narrower side somewhat coarsely dentate, the teeth from 6 to 9 on the wider and rather fewer on the narrower side, usually obtuse except the lowest, the terminal tooth from broadly ovate to narrowly lanceolate, continuing the general outline of the leaf or distinctly acuminate, usually obtuse, both surfaces often sparingly pilose, marked with cystoliths, triplinerved, with 3 to 5 additional veins, the finer reticulations usually very inconspicuous; stipules lanceolate to linear-lanceolate, 1.5 to 3 mm long.

LUZON, District of Bontoc, Bauco, *Vanoverbergh 829:* Province of Benguet, Baguio, *Elmer 6574:* Province of Pampanga, Mount Arayat, *Merrill 4218:* Province of Rizal, Montalban, *Bur. Sci. 6135* (type), *9531, 9532, 9544, 9652 Robinson, Phil. Pl. 264 Merrill;* Bosoboso, *For. Bur. 3360 Ahern's collector, Bur. Sci. 1096 Ramos;* San Francisco, *Marave 33;* Malapadnabato, *Bur. Sci. 12127 Ramos, Bur. Sci. 11843 Robinson.*

The Malapadnabato collections, made in bulk, have greatly strengthened faith in the value of pedicelled staminate receptacles as a valid character, but indicate

the opposite for the pistillate. They have further completely linked together what had seemed to be two distinct species. A further possible result of Ramos' find is that this may solve the puzzle of *Dorstenia pubescens* Blanco, as Malapadnabato is only separated from Pasig by the river: the habit stated by Blanco is still an obstacle.

The species approaches the polymorphic Indian *E. surculosum* Wight, many of whose variations it parallels. But the subopposed reduced leaves so characteristic of that species are very rare in *E. luzonense*, being found on about 5 per cent of perhaps 400 plants examined for the purpose, and even in these it was normal on three stems (not plants) only, on the others confined to one or two nodes: moreover the leaves are more often not glabrous, although this is best seen on fresh material. As *E. luzonense* seemed to come even closer to *E. sikkimense* Clarke, material then considered very representative was sent to Calcutta, and Mr. W. W. Smith, to whom I am greatly indebted for this and much other valuable assistance, considered it sufficiently distinct, *E. sikkimense* being two to three times larger, with the leaves larger, quite glabrous, and much more distinctly acuminate, and with very long peduncles. The more recent collections have shown *E. luzonense* to be still nearer to *E. sikkimense* than originally supposed, but I still consider it distinct.

A collection not above cited, *Bur. Sci. 1095 Ramos*, Bosoboso, Rizal, has the stems densely substrigose, but has no staminate receptacles, so that a definite opinion is deferred: so far there seems nothing but the pubescence to prevent its inclusion in *E. luzonense*. *E. lanaense* is very similar in habit, but differs in several ways.

2. **Elatostema variabile** sp. nov. (Plate I, Vol. VI.)

Receptaculis pistilliferis sessilibus, mediocribus, bracteis marginem versus solum liberis, triangulari-lanceolatis vel triangulari-ovatis, corniculatis vel acuminatis; floribus typicis: foliis membranaceis, difformibus, saepissime anguste oblongo-lanceolatis, sed etiam oblanceolatis vel oblongo-ovatis, margine integris, vel irregulariter obscureque undulatis, vel obscure vel subgrosse dentatis, saepe basim versus lobatis, subpinnatinerviis vel triplinerviis.

Pistillate receptacles sessile, attaining 1 cm in diameter, the bracts fused except toward the margins, the outer nearly similar to the others, triangular-ovate to triangular-lanceolate, free for about 2 mm, ciliate on the margins, bracteoles, linear-oblanceolate, 2 mm long, densely ciliate; perianth minute, 3-lobed; achene ellipsoid, about 0.8 mm long, about 8-striate.

Plants erect except at base, 20 to 50 cm high, the vegetative parts glabrous: leaves subsessile, the lamina when dry thinly membranaceous, from 10 cm long and 15 mm wide to 2.5 cm by 13 mm, extremely variable, most often narrowly oblong-lanceolate, but also narrowly lanceolate, oblong-ovate, or obovate, the costa straight or curved, the base distinctly inequilateral, farther produced on the wider side, rounded, obtuse, or subobtuse, the margins entire, or obscurely and irregularly wavy, shallowly or for the size of the leaf coarsely serrate, the teeth numbering from 1 to at least 10, the distance of the lowest tooth from

the base varying from 7 to 35 mm, the lowest tooth of the broader side often projecting beyond the general outline so that the leaf appears lobed, the teeth usually extremely shortly acuminate, the apex never projecting beyond the general outline of the leaf, but contracted at each of the apical 2 or 3 teeth when these are present, in entire leaves gradually tapering, minutely apiculate, except for this the terminal tooth varying in shape from narrowly lanceolate to semicircular; sometimes definitely triplinerved, but the nerves, especially on narrower leaves except the lobed ones, little longer than the succeeding veins, the arched connections forming a distinct lateral vein; both surfaces with fairly long cystoliths: stipules lanceolate, acute, 2.5 to 4 mm long, deciduous.

LUZON, District of Bontoc, Bauco, in forests at 1650 m elevation, *Vanoverbergh 828*. The specific name is descriptive, even for *Elatostema*, it being difficult to characterize the leaves in words that would not include half the species of the genus. Staminate receptacles have not yet been collected, but it is very probable that the alliance is with the species with which it is here placed, having peduncled receptacles with corniculate bracts.

3. **Elatostema longipedunculatum** Elmer Leafl. Philip. Bot. 3 (1910) 886.

Repens, ramosum: inflorescentiis staminiferis pedunculis gracilibus sparse pilosis 1 ad 3 cm longis suffultis; bracteis exterioribus orbiculari-ovatis, inaequalibus, 3 ad 5 mm longis, corniculatis; floribus pentameris, perianthio corniculato, dorso sparse piloso, ciliato: inflorescentiis pistilliferis sessilibus; bracteis exterioribus lanceolatis, 2 mm longis, ciliatis cum aliis interioribus corniculatis, his pilosis; floribus adhuc juvenilibus: foliis brevissime petiolatis vel subsessilibus, oblique oblanceolatis vel ellipticis, 7 ad 11 cm longis, 2 ad 2.7 cm latis, basi obtusis vel uno latere acutis, margine basi excepta admodum grosse dentatis, apice in acumen dentatum subbicentimetrale productis, triplinerviis, venis utrinque 4 ad 6 subtus antrorse pilosis, aliter glabris vel obscure pilosis; stipulis lanceolatis, acuminatissimis, 6 ad 8 mm longis.

MINDANAO, District of Davao, Mount Apo, at 1,800 m elevation, *Elmer 11593*.

4. **Elatostema pinnatinervium** Elmer Leafl. Philip. Bot. 1 (1908) 286.

Caespitosum, suberectum vel subdecumbens, 5 usque ad 25 cm altum, caulibus subretrorse tuberculatis: inflorescentiis staminiferis pedunculis 3 ad 6 mm longis suffultis, paucifloris, bracteis exterioribus corniculatis: inflorescentiis pistilliferis sessilibus; bracteis corniculatis; perianthio minuto: foliis submembranaceis, oblanceolatis ad obovatis, superioribus saepissime longioribus, 1.5 ad 2.5 cm longis, 6 ad 15 mm latis, pinnatinerviis, venis dentibusque utrinque 5 ad 9.

LUZON, Province of Tayabas, Lucban, *Elmer 9193* (type collection); Anoling River (Infanta), *Bur. Sci. 9323 Robinson*, the former pistillate, the latter a slightly more delicate plant with staminate flowers also.

Very distinct from any other described Philippine species, but it is probably the closest alliance of *Bur. Sci. 9195 Robinson*, from Mount Malulud, Polillo,

sterile, with extremely variable leaves, the terminal linear-lanceolate, 6 to 7 cm long. The further relationship is also obscure, but they may well approach nearest to the very imperfectly known *E. filicoides* Seemann, of Fiji.

5. **Elatostema filicaule** sp. nov.

Repens, caulibus gracilibus, glabris vel apice obscure retrorse pilosis: receptaculis staminiferis pedunculis gracilibus suffultis, paucifloris, bracteis corniculatis; receptaculis pistilliferis ignotis: foliis parvis, membranaceis, oblique oblanceolatis ad obovatis, basi latere inferiore subauriculatis, latere superiore acutis, margine dentibus 1 vel 2 obtusis instructis.

Staminate inflorescences solitary, on slender, glabrous peduncles 1 to 2.5 cm long; receptacles 2 to 4 mm in diameter; outer pair of bracts lance-ovate, including the spurs about 3.5 mm long, ciliate along the midvein; inner pairs much smaller, less than 2 mm long, elliptic-lanceolate, apiculate; flowers few (4 to 6), shortly pedicelled, very unequal in size, the perianth-segments 4, orbicular, of the largest about 2 mm long, the dorsally placed spur nearly 1 mm long; filaments about 1 mm long, the anther-cells 1.5 mm long, free except near the insertion: pistillate receptacles unknown.

A slender, creeping plant, simple or less often sparingly branched, the stems mostly 10 to 20 cm long, glabrous or toward the apex with scattered reflexed hairs: leaves subsessile, the lamina membranaceous, obliquely oblanceolate or obovate, 2 to 12 mm long, 2 to 6 mm wide, the lower frequently reduced, the upper margin acute at the base, nearly straight and forming one subapical tooth, the lower margin produced into a short rounded auricle at the base, 1- or 2-toothed, the apical tooth of the leaf broadly rounded or barely apiculate, margins of the sinuses often overlapping at least at their bases; the upper surface more or less pilose and with fairly numerous, comparatively long cystoliths, the under surface glabrous except rarely along the veins, and destitute of cystoliths; triplinerved, additional veins on each side 1 or 2; stipules linear-lanceolate, about 1 mm long.

Luzon, Province of Benguet, Pauai, in mossy forest at about 2100 m elevation, *Merrill 6621*. Among Philippine species, resembling only the next two, *E. inaequifolium* being easily distinguished by the different shape of the leaves, and *E. heterophyllum* by the very different dentation and the pubescent stems.

6. **Elatostema inaequifolium** Elmer Leafl. Philip. Bot. 3 (1910) 887.

Repens, simplex vel ramosum, glabrum, 10 ad 20 cm longum: inflorescentiis staminiferis pedunculis gracilibus 5 mm ad 1 cm longis suffultis, 3 mm diametro, paucifloris, bracteis exterioribus orbiculari-ovatis, acuminatis, brevissime corniculatis, floribus tetrameris: inflorescentiis pistilliferis sessilibus, 2.5 mm diametro, bracteis exterioribus oblongo-lanceolatis, parce ciliatis, brevissime corniculatis; perianthio obscurissime trilobato, minuto; ovario compresso-oblanceolato, leviter striato: foliis subsessilibus, membranaceis, lanceolatis vel ovatis, valde

inaequimagnis, 2 ad 20 mm longis, 1 ad 8 mm latis, basi obtusis vel rotundatis vel latere angustiore acutis, lateris latioris margine 2- vel 3-dentatis, angustioris 1- vel 2-dentatis, apice in acumen obtusum integrum protractis, tri-triplinerviis, lateris angustioris nervo basali, latioris admodum altius inserto, venis paucis tenuissimis; stipulis inconspicuis.

MINDANAO, District of Davao, Mount Apo, at 1725 m elevation, *Elmer 11545*. This is allied to the last, and has also much the appearance of *E. microphyllum* and *E. acrophilum*, whose staminate receptacles are unknown so that they may belong rather with the present species than with the group in which they are placed. From all three, it can easily be distinguished by the leaves.

7. **Elatostema heterophyllum** sp. nov.

Repens, radicans, caulibus dense pilosis: receptaculis staminiferis pedunculatis, paucifloris, bracteis exterioribus corniculatis: receptaculis pistilliferis sessilibus: foliis parvis, discoloribus, submembranaceis, obovatis vel ovalibus, marginibus grosse vel modice 1- vel 2-dentatis vel integris.

Apparently always dioecious: staminate receptacles upon slender, succulent, glabrous peduncles 2.5 to 15 mm long; bracts almost free, the outer pair suborbicular, 3.5 to 4 mm long, the conspicuous keel produced into a spur, pilose on the spur, densely so on and near the margins, and sparingly between; the intervening two pairs shorter and proportionally narrower, otherwise similar; flowers 6, on glabrous pedicels up to 2.5 mm, subtended by a single oblanceolate bracteole about 2.5 mm long, densely ciliate at the apex and sparingly so on the margins; perianth-segments 4, oval, one or more of them spurred, about 2 mm long, sparingly pilose near the apex; filaments flattened, about 2 mm long, anthers less than 1 mm long: pistillate receptacles sessile or subsessile (peduncles not over 0.5 mm), 3 to 4 mm in diameter; formed by 12 or more nearly similar bracts, free except at their bases, oblong-lanceolate, acuminate, 2 mm long, densely ciliate on the margins; young flowers shortly pedicelled; perianth minute, sometimes ciliate; ovary 0.4 mm long; stigma penicillate.

Slender, creeping plants 6 to 12 cm long, the stems densely ferruginous- or white-pilose: leaves subsessile, the lamina almost chartaceous, strongly or slightly inequilateral, in general outline obovate or orbicular, 1.5 to 17 mm long, 1.5 to 9 mm wide, the base on the upper side rounded or somewhat acute, on the lower extending about 1 mm beyond that of the upper, forming an auricle, overlying the petiole and sometimes slightly projecting on its upper side, entire on both margins, on the upper only, or on neither, the teeth of the upper margin never more than one, of the lower margin usually one, but sometimes two, in size ranging from mere discontinuity to coarse teeth 2 mm wide, the margins of the sinuses, the extreme base excepted, making about a right angle with one another, leaf-apex nearly always rounded except on leaves dentate on both sides, then forming an ovate or lanceolate acumen, obtuse or subacute; upper

surface dark-green, sparsely pilose especially near the margin or nearly glabrous, marked with conspicuous cystoliths, the under surface pale-green, setose on the principal veins, lepidote but destitute of cystoliths; more or less triplinerved, but on the lower side the nerve little longer or even shorter than the 1 or rarely 2 more apical veins, the nerve of the upper side usually definitely longer than the single succeeding vein; stipules lanceolate, about 1 mm long.

NEGROS, Canlaon Volcano, in forests at 900 to 1200 m elevation and on cliffs and boulders in damp shaded ravine at 1320 m, *Merrill 6911*.

8. **Elatostema cheirophyllum** sp. nov.

Repens, radicans, caulibus pilosis: receptaculis staminiferis pedunculatis, paucifloris, bracteis exterioribus corniculatis: receptaculis pistiliferis sessilibus: foliis parvis, submembranaceis, obovatis, marginibus 1- ad 3-dentatis vel rarissime integris.

At least sometimes monoecious: staminate receptacles upon slender glabrous peduncles 6 to 7 mm long; bracts about 3 mm long with short subapical spurs, glabrous or obscurely ciliolate, the outer nearly orbicular, the apex broadly rounded or subtruncate, the inner pairs lanceolate; flowers about 6, pedicels of different lengths in same receptacle, probably attaining 3 mm in length; perianth-segments 4, oblong to ovate, the outer 1.5 mm long, corniculate, the inner somewhat shorter: pistillate receptacles sessile; bracts lanceolate to ovate, pilose, shortly corniculate or acuminate, about 1.5 mm long; pedicels about 0.5 mm long, perianth-segments 3, ovate, obtuse, a little exceeding 0.1 mm in length; achenes brown, in outline oblong-oblanceolate, about 0.6 mm long.

A creeping, rooting plant, with pilose stems usually a little less than 10 cm long: leaves with petioles 1 mm long or less, the submembranaceous lamina obovate, usually 8 to 13 mm long and 4.5 to 7 mm wide, but many much smaller, the base of the upper side acute, that of the lower extending beyond the upper, hardly forming an auricle, rounded or almost acute; smaller leaves often entire or nearly so, but the larger with 1 or 2 teeth on the upper margin and 2 or 3 teeth on the lower, the teeth coarse for the size of the leaf, the general directions of the sinuses making an angle of from 10 to 45 degrees, the apical teeth obtuse, the lower often acute, the terminal tooth oblong to ovate, very obtuse or barely acuminate; upper surface with conspicuous cystoliths, the lower lepidote, pilose on the veins, without cystoliths; triplinerved, but the nerve of the lower side little longer than the succeeding, additional veins 1 or 2, rarely 3; stipules oblong or oblong-oblanceolate, nearly 2 mm long, subpersistent, obtuse or apiculate.

NEGROS, Province of Negros Occidental, Himugaan River, *Whitford 1595 Whitford & Everett*. A species closely allied to the preceding, with which future collections may possible unite it, but in general appearance much more nearly

resembling *E. pulchellum*, a glabrous species with sessile male receptacles. The leaves of *E. cheirophyllum*, except in the cuneate base, have much resemblance to a hand with short stubby fingers.

9. **Elatostema simulans** sp. nov.

Basi solum radicans, caulibus rigidiusculis, densiuscule setosis: receptaculis staminiferis pedunculis gracilibus glabris suffultis, paucifloris; bracteis exterioribus liberis, corniculatis: receptaculis pistilliferis sessilibus, bracteis exterioribus numerosis, liberis; perianthio minuto: foliis chartaceis, admodum parvis, oblique oblanceolatis ad obovatis, margine ima basi excepta dentatis.

Monoecious or dioecious: staminate receptacles white, yellowish when dry, 2.5 to 5 mm in diameter, borne on glabrous peduncles 8 to 20 mm long, outer pair of bracts free from one another, orbicular, about 4 mm in length, ciliate on the apical half of the margins, the strong dorsal keel produced into a short spur hardly overtopping the bract; succeeding two pairs of bracts obovate, 3 mm long, with less definite keels and spurs, otherwise similar to the outer; bracteoles several, similar to the bracts but narrower; flowers few, on glabrous pedicels ultimately about 2 mm long; perianth-segments 4 or 5, suborbicular, the dorsal spur almost as long and sometimes pilose; filaments and anthers each about 0.6 mm long: pistillate receptacles sessile, 2 to 3 mm in diameter, the bracts nearly or quite free, numerous, stellately arranged, the outer pair ovate, 1.5 mm long, the inner narrower, all more or less pilose, acuminate; flowers shortly pedicelled; perianth minute; ovary ellipsoid, about 0.5 mm long, the penicillate stigma long-pilose.

Creeping at the base, but the stems erect or suberect, not exceeding 1 mm in diameter but almost woody, simple or very rarely branched except at the base, quadrangular, densely setose toward the apex, below glabrescent: leaves shortly petioled, the lamina chartaceous, obliquely oblanceolate to obovate, 4 to 43 mm (usually 15 to 25 mm) long, 3 to 20 mm wide, the base of the upper side narrowed, rounded at its insertion on the petiole, the lower side of the base produced about 1 mm below the upper, forming a short auricle; both margins cut from shortly above the base into from 9 to 13 teeth, or on small leaves fewer, even to 3 or 4, the lower teeth acute, the upper obtuse but apiculate, the sinuses acute, the terminal tooth ovate, 2 to 3 mm long; the upper surface glabrous but crowded with conspicuous cystoliths, the under surface destitute of cystoliths but setose or pilose on the veins; stipules ovate, 2 mm long, acuminate.

LUZON, Province of Nueva Vizcaya, Bayombong, *Bur. Sci. 8145 Ramos:* Province of Laguna, Los Baños, *Hallier s. n.* A plant with great superficial similarity to species of the *E. sessile* group, but sharply distinguished by its slenderly peduncled male receptacles.

10. **Elatostema obovatum** Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 190; Arch. Mus. Paris 9 (1856) 326; DC. Prodr. 16[1] (1869) 188; Vidal, Rev. Pl. Vasc. Fil. (1886) 256.

Luzon, Province of Laguna, Calauan, *Cuming 628*. This is probably not the type collection. In the original description, there is no reference to locality or collector; in the Monograph (Archives), *Cuming 52* is alone cited, but that number is a fern, *Polypodium dolichopterum* Copel.; in the Prodromus, the citations are "Callery, Cuming, n. 52 et 628:" Vidal separates this as *Cuming 628* and *Callery 52*. I believe that he was correct and that Callery's collection was the type: this I have not seen, nor can I match Cuming's specimen by any recent collections. The staminate receptacles are unknown, our specimen, like those studied by Weddell, having only the pistillate.

11. **Elatostema delicatulum** Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 190.

E. glaucescens β. delicatula Wedd. in Arch. Mus. Paris 9 (1856) 325.

E. obtusum β. delicatulum Wedd. in DC. Prodr. 16[1] (1869) 187.

? E. obtusum Wedd. in DC. Prodr. l. c., quoad philippinense; F.-Vill. Noviss. App. (1880) 204.

? Dorstenia pubescens Blanco Fl. Filip. (1837) 692, non Forst. f. Prodr. (1786) 11.

E. delicatum Elmer Leafl. Philip. Bot. 2 (1908) 467.

Luzon, Province of Isabela, *Bur. Sci. 8018 Ramos:* Province of Rizal, Bosoboso, *Bur. Sci. 1092 Ramos:* Province of Laguna, Los Baños, *Hallier s. n., Bur. Sci. 9897, 9898, 9921 Robinson;* Mount Maquiling, *Phil. Pl. 296 Merrill;* Lilio, *Bur. Sci. 6011 Robinson.* Negros, Cuernos Mountains, *Elmer 10343* (cotype of *E. delicatum*).

This species and the next, almost certainly distinct, present problems of exceptional difficulty. No collection is specified in the original description of *E. delicatulum:* in the Archives, where it is made a variety of *E. glaucescens*, there first described, those cited are not discriminated between species and variety. In the Prodromus, *E. delicatulum* is transferred as a variety to the Indian *E. obtusum*, the collectors are given as Callery and Barthe, and a collection by Barthe is cited under typical *E. obtusum*. For *E. glaucescens*, the collections cited are *Commerson* (presumably given to Commerson by Sonnerat, who was in Laguna), *Callery*, and *Cuming 629*. Cuming's number is also the type of *E. brongniartianum* Wedd., but our sheet contains two species, undoubtedly those intended by Weddell. Dr. Gagnepain, of the Muséum d'Histoire Naturelle, Paris, has compared *Bur. Sci. 6011* with the type of *E. delicatulum*, and considers it the same. The conclusions reached here, after study both in herbarium and field, are that Barthe's plants, not seen by me, may well have been different stages of the same species, that *E. delicatulum* is closely allied to *E. glaucescens*, and while very similar vegetatively to *E. obtusum*, is quite distinct from it in the pistillate receptacles. On the last point, possible differentiating characters suggested by the descriptions are that the pistillate receptacles of *E. obtusum* are peduncled,[34] that the bracts of the staminate receptacles are ovate and glabrous, and the leaves never over 12.5 mm in length. In *E. delicatulum*, the pistillate receptacles are sessile, the pilose bracts of the staminate are lanceolate, the leaves while variable in length usually exceed the limits noted for *E. obtusum*. However, Mr. W. W. Smith, of the Royal Botanic Garden, Calcutta, to whom what is considered very typical material of *E. delicatulum* had been sent, writes that he can not see much difference between it and their Indian types of *E. obtusum*, as

[34] Hook. f. Fl. Br. Ind. 5 (1888) 573.

far as the leaves and the male plant are concerned. The peduncled female receptacles are a better distinction, the question remaining as to their validity as a specific character. In *E. luzonense*, as previously stated, it seems of no value. He has further sent me a specimen of *E. obtusum*, *Duthie 3383*, Kumaon, west Himalayas, and while I can not but agree as to the vegetative similarity, with the addition that it is even nearer *E. filicaule*, the pistillate receptacles do seem quite distinct. The pedicels are so short that little emphasis can be laid on them, but the receptacles themselves are very different. The bracts are pubescent but very much less so than in *E. delicatulum*, the achenes seem to be solitary, and are from nearly 2 mm to 2.5 mm long. Should the two species be held identical, *E. delicatulum* is the older name. *Procris obtusa* Wall. Cat. is presumably a *nomen nudum*, and *Elatostema obtusum* Wedd., so far as the Ann. Sci. Nat. is concerned, being based on it alone, can have no higher status. *E. delicatulum* comes two places lower on the same page, but has a sufficient description.

As regards *E. glaucescens*, the plants on *Cuming 629* belonging to it can be distinguished by their color, and have excellent matches in *Whitford 174*, which contains the same mixture as that of Cuming, and in *Yoder 226:* my collections do not show the color character, but have no other differentiating features.

On the question of the distinctness of *E. delicatulum* and *E. glaucescens*, there is much room for difference of opinion, and the following field observations may be of assistance. Both, at least as here interpreted, grow in considerable abundance, on rocks, sometimes wet, sometimes fairly dry, in many places on both branches of the Dampalit gorge, near Los Baños: both may be found on the same rock, though this is unusual. Ordinarily, *E. delicatulum* is well described by the name, the leaves are pale, their dentations very obtuse, indeed, many leaves are entire; all staminate receptacles found contained very few flowers, with the lanceolate bracts slenderly acuminate: *E. glaucescens* is more robust, with thicker, darker-colored leaves, and the dentations are acute; their staminate receptacles were always larger, the bracts somewhat broader, still acuminate, but more shortly and stoutly: Weddell, on the contrary, describes them as few-flowered. It is further to be noted that in drying the leaf-dentations of *E. delicatulum* may shrink until it is very difficult to distinguish them from those of *E. glaucescens:* there is room for suspicion that variation in moisture conditions may have been responsible for these differences in the living plants, but apparently *E. glaucescens* preferred the moister situations, so far as any differences could be observed.

Of the very close alliance of *E. delicatum* and *E. delicatulum* there is no doubt. Vegetatively, they are quite the same, and the staminate receptacles are very similar, but not identical.

Some of those of *E. delicatum* are distinctly longer-peduncled and more pilose, larger with longer bracts; on the other hand, they are older than any of *E. delicatulum* available for comparison: the pistillate receptacles of *E. delicatum*, when collected, may yield distinguishing characters, but at present it does not seem advisable to keep them apart. The latest collections still further diminish the difference.

From its description, this is the best disposition of *Dorstenia pubescens* Blanco. *Elatostema luzonense* has very recently been found near Pasig, whence Blanco obtained his plants, and is another probability, but the size assigned to them would better suit *E. delicatulum*.

12. **Elatostema glaucescens** Wedd. in Arch. Mus. Paris 9 (1856) 325; DC. Prodr. 16[1] (1869) 187.

E. sessile var. *brongniartianum* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 48, pro parte, quoad Whitford 174, pro parte.

LUZON, Province of Bulacan, Norzagaray, *Yoder 226:* Province of Bataan, Mount Mariveles, *Whitford 174* in part: Province of Laguna, Calauan, *Cuming 629* in part; Los Baños, *Bur. Sci. 9896, 9920 Robinson;* Mount Maquiling, *Phil. Pl. 295 Merrill:* Province of Rizal, Jalajala, *Bur. Sci. 11895 Robinson & Ramos.*

13. **Elatostema pulchellum** sp. nov.

Dioicum: pusillum, caulibus simplicibus vel subsimplicibus, glabrum: receptaculis sessilibus, paucifloris; staminiferorum bracteis et perianthii segmentis corniculatis; pistilliferorum perianthio pro genere longiusculo saepe inflexo: foliis admodum parvis, membranáceis, saepius obovatis, triplinerviis, margine 1- ad 4-dentatis.

Apparently always dioecious: staminate receptacles sessile, the outer pair of bracts broadly oval or suborbicular, 2.5 to 3 mm long, keeled and corniculate, the margins ciliate-serrate or entire; inner bracts similar but much smaller; flowers few, subsessile; perianth-segments 4, suborbicular, 1.5 mm long, obtuse, corniculate; stamens 4, filaments less than 1 mm long, anthers white, oval, 0.8 mm long, the cells contiguous at both extremities: pistillate receptacles sessile or on extremely short peduncles, few-flowered; bracts free except at the base, about 2 mm long, acuminate, pilose, the outer ovate, the inner oblong or oblanceolate; pedicels stout in proportion to the minute flower, about 0.5 mm long; perianth-segments 3, appearing in young flowers as typical in the genus, ovate, rounded, but at least often with the apical half incurved upon the lower, in older flowers straightening, often inclosing one-third or more of the achene, the apex always obtuse, never corniculate; ovary not striate; the achene longitudinally striate, brown, 0.8 to 1 mm long.

A weak plant, with glabrous stems, the leaves of the lower nodes usually reduced or wanting: leaves subsessile, the lamina membranaceous, oblanceolate, obovate, or nearly oblong, the reduced ones excepted 7 to 30 mm long, 4 to 9 mm wide, usually strongly inequilateral, minutely punctate, the base of the upper side acute, above the base straight or moderately curved, with 1 or much more rarely 2 teeth, when 2 the lower usually minute, acute, and appressed; lower side at base rounded or forming a very short auricle, above the base curved, with usually 2, more rarely 1 or 3 teeth; teeth large for the size of the leaf, usually obtuse, sometimes apiculate; terminal tooth not or hardly prolonged beyond the general outline of the leaf, lanceolate or broadly lanceolate, 2 to 8 mm long, obtuse; upper surface with abundant cystoliths and often setose especially near the margins, under surface without cystoliths, glabrous; triplinerved, additional veins usually inconspicuous, 1 or 2 on each side; stipules linear or linear-lanceolate, acute, about 1.5 mm long.

LUZON, Province of Laguna, Mount Banajao, *Bur. Sci. 6577 a, 9824* (type), *9835 Robinson.* MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4636, 4650 Mearns & Hutchinson:* District of Davao, Mount Apo, *Copeland 1128, Elmer 11343.* The type and *Elmer 11343* have both staminate and pistillate

flowers, the others pistillate only. A plant of high elevations, noted on Banajao and Apo from 1800 to 2475 m. This is the species referred to on page 499 as having pistillate flowers with a perianth abnormal for the genus by being often incurved and when outspread of greater length in proportion to the ovary than in most other species. Owing to the minuteness and delicacy of the perianth, its exact nature is often difficult to determine, and this character may prove less unusual: in any event, there can be no doubt of the close alliance of *E. pulchellum* to the following species.

14. **Elatostema acrophilum** sp. nov.

Dioicum, receptaculis staminiferis ignotis, pistilliferis sessilibus; perianthio minuto: caulibus apice adpresse setosis; foliis membranaceis, utrinque glabris, saepius subfalcatis, valde inaequilateralibus, lateris inferioris basi auriculatis, margine 2- ad 5-dentatis, 4- ad 6-plinerviis.

Dioecious: pistillate receptacles sessile, 4 mm in diameter; outer pair of bracts ovate, ciliolate or glabrous, 1.5 mm long, obtuse, obscurely corniculate, inner bracts somewhat longer, stellately disposed, strongly ciliate, corniculate or acuminate; bracteoles linear-oblanceolate; pedicels about 0.6 mm long; perianth-segments 3, less than 1 mm long, obtuse; ovary ellipsoid, about 0.5 mm long; stigma penicillate.

Weak creeping plants, usually branched, the stems 10 to 25 cm long, minutely appressed-setose at the apex; leaves subsessile, alternate or very rarely subopposite, the basal often greatly reduced, with these excepted the lamina membranaceous, obliquely elliptic or obovate, 8 to 25 mm long, 4 to 8 mm wide, strongly inequilateral, subfalcate, the base of the upper side meeting the costa 1 to 2 mm from the stem at an acute or subobtuse angle, the base of the lower side forming a broad rounded auricle often overlapping the stem; upper margin with 2 to 4, lower with 2 to 5 teeth, these obtuse or the lower acute; apical tooth not or slightly projecting beyond the general outline of the leaf, lanceolate to ovate, 1 to 4 mm long, obtuse or acute; both surfaces glabrous and with cystoliths, the under glaucescent; 4- to 6-plinerved, in addition to the costa and the normal nerve on either side, usually with 1 on the upper side and 2 on the lower developing exteriorly; additional veins 3 or 4, well reticulated on the upper surface; stipules lanceolate, acute, about 1 mm long.

Luzon, Province of Laguna, at and near summit of Mount Banajao, *Bur. Sci. 6577 Robinson* (type), *Copeland s. n.*, growing with the last, to which, however, it is not as nearly allied as to the following.

15. **Elatostema microphyllum** Elmer Leafl. Philip. Bot. 1 (1908) 286.

Subcaespitosum, caulibus apice praesertim adpresse pubescentibus: dioicum; receptaculis pistilliferis sessilibus, parvis, floribusque eis speciei praecedentis similibus: foliis alternis, subsessilibus, oblique oblanceolatis, oblongis, vel obovatis, 6 ad 13 mm longis, 3 ad 4.5 mm latis, vel inferioribus minoribus, basi utrinque cuneatis vel margine inferiore leviter auriculatis, supra medium latere superiore 2- vel 3-dentatis latere in-

feriore 2- ad 5-dentatis, dentibus saepissime acutis, dente terminali haud protracto, breve, obtuso vel subacuto; triplinerviis, venis superioribus obscuris lateris superioris saepius 1, lateris inferioris 2 vel 3, pagina utraque cystolithis notatis.

Luzon, Province of Tayabas, Lucban, *Elmer 9149* (type collection): Province of Laguna, Mount Banajao, *Bur. Sci. 9777 Robinson.* A plant of comparatively low elevations, 700 to 800 m on both mountains. In spite of the very manifest dissimilarity in general resemblance, this species is very closely allied to the preceding, the second collection, while certainly to be identified with *E. microphyllum*, tending to vary in the direction of *E. acrophilum.* The difference in elevation means less in this instance than might be supposed, for the ravine where *Bur. Sci. 9777* was obtained contains many species normally found at much higher altitudes on the same mountain, even at the summit.

16. **Elatostema oblanceolatum** sp. nov.

Repens, caulibus pilis subrigidis saltem apice adspersis: receptaculis pistilliferis subsessilibus, parvis; perianthio minuto: foliis oblanceolatis, basi utrinque cuneatis, margine integris vel uno vel utroque latere 1-dentatis, triplinerviis.

Dioecious; pistillate receptacles sessile or subsessile, the outermost bracts broadly lanceolate, corniculate, 2.5 mm long, the inner narrower, often oblanceolate, the bracteoles still narrower, all conspicuously long-ciliate; flowers on short comparatively stout pedicels; perianth-lobes 3, usually not exceeding 0.1 mm in length but in the same receptacle sometimes considerably longer, never sufficiently to inclose more than the basal third of the ovary; about 1 mm long.

Creeping plants with stems 5 to 10 cm long, simple or sparingly branched, bearing especially toward the apex rather scattered stiff white hairs; leaves subsessile, the membranaceous lamina oblanceolate or rarely elliptic-oblanceolate or obovate, mostly 6 to 13 mm long, 2.5 to 4.5 mm wide, or some of them smaller, acute on both sides at the base, entire or somewhat more frequently with a single tooth on the lower or on each side; terminal tooth rounded, apiculate; both surfaces glabrous and provided with rather long but often not very conspicuous cystoliths, often with stiff cilia on the margins; triplinerved, additional veins slender, single or wanting on the upper side, 1 or 2 on the lower.

Negros, Canloan Volcano, on steep moss-covered shaded banks of stream, at 900 m elevation, *Merrill 6909.*

17. **Elatostema philippinense** Elmer Leafl. Philip. Bot. 3 (1910) 888.

Suberectum vel scandens: ramosum, 20 ad 30 cm longum, caulibus apicem versus sparse pubescentibus: receptaculis staminiferis sessilibus, bracteis exterioribus ovatis, acuminatis, corniculatis, 3.5 mm longis, ciliatis, interioribus subaequilongis sed multo angustioribus, corniculatis; perianthio 5-partito, corniculato: foliis brevissime petiolatis vel sessilibus, membranaceis, oblique ellipticis vel lanceolatis, 3 ad 8

cm longis, 8 ad 22 mm latis, aliis minoribus sed similibus, basi uno latere acutis altero auriculatis obtusis vel rarissime acutis, margine e basi obtuse vel subacute altiuscule dentatis, dentibus saepe dentatis, apice in acumen gracile dentatum protractis, subpenninerviis, venis utrinque 4 ad 8, subtus sparse pubescentibus; cystolithis minutis; stipulis lanceolatis, circiter 6 mm longis, persistentibus.

MINDANAO, District of Davao, Baruring River, *Elmer 11751, 11746.* NEGROS, Canlaon Volcano, *Merrill 6907.* POLILLO, *Bur. Sci. 6841 Robinson.* Both the last differ slightly from the type, but not in essential characters. The leaves are somewhat similar to the more normal ones of *E. diversifolium* Wedd., but the aberrant ones of the latter are wanting, and there are many other differences.

18. **Elatostema hastatum** Elmer Leafl. Philip. Bot. 2 (1908) 466.

Repens, succulentum, caulibus circiter 30 cm longis, apice praesertim setosis: receptaculis staminiferis sessilibus, bracteis extus ciliatis vel strigosis, subliberis; floribus pedicellatis; perianthii segmentis staminibusque 5: foliis submembranaceis, oblique oblongis vel obovatis, 10 ad 15 mm longis, 4 ad 6 mm latis, vel nonnullis minoribus, superioris lateris basi acutis vel obtusis, inferioris lateris oblique vel subrecte protractis, caulem saepissime obtegentibus semihastatisque, dentibus praeter medium superioris lateris 2, inferioris 3, dente terminale breve, haud protracto; triplinerviis, venis 1 vel 2; cystolithis in utraque pagina conspicuis, superne sparse subtus in venis densius setosis.

NEGROS, Province of Negros Oriental, Cuernos Mountains, *Elmer 9829* (type collection). The leaf-base is very characteristic.

19. **Elatostema viridescens** Elmer Leafl. Philip. Bot. 1 (1908) 285.

Erectum, inflorescentiis pistilliferis exceptis glabrum, 20 ad 90 cm altum, caule valde succulento, sulcato: dioicum vel rariter monoicum; receptaculis staminiferis saepissime brevissime pedunculatis; bracteis exterioribus orbiculari-ovatis, circiter 5 mm longis, apice acuminatis, ciliatis, cornu cylindraceo falcato 2 ad 3 mm longo instructis, bracteis interioribus multo minoribus, haud vel obscure corniculatis; floribus tetrameris: receptaculis pistilliferis solitariis vel binis, sessilibus, circiter 5 mm diametro; bracteis exterioribus suborbicularibus, conspicue corniculatis; floribus typicis: foliis membranaceis vel subchartaceis, oblique lanceolatis vel anguste ellipticis, saepius subfalcatis, triplinerviis, lateris superioris basi acutis, inferioris acutis vel brevissime auriculatis, superioris lateris dentibus vel serraturis 4 ad 11, inferioris 8 ad 15, dente terminali in acumen protracto; stipulis lineari-lanceolatis, 4 ad 7 mm longis.

LUZON, Province of Bataan, Lamao River, *Williams 306:* Province of Cavite, Mendez Nuñez, *Bur. Sci. 1350 Mangubat:* Province of Laguna, Los Baños, *Elmer 8076* (type collection), *Bur. Sci. 6715, 9895 Robinson, Phil. Pl. 263 Robinson, Hallier s. n.:* Province of Tayabas, Atimonan, *Whitford 631.*

In dried material, the leaves, which are from 12 to 18 cm long, often have a distinct yellowish tinge, especially on the veins of the under surface; both surfaces show very numerous crowded cystoliths; the points of origin of the nerves are separated by at least 5 mm and often much more, they are nearly parallel with the margin and connected with the costa by from 3 to 8 veins.

20. **Elatostema banahaense** sp. nov.

Erectum, glabrum: inflorescentiis staminiferis breviter crasseque pedunculatis vel subsessilibus, bracteis corniculatis; floribus juvenilibus tetrameris: foliis subsessilibus, membranaceis, oblique oblanceolatis, basis uno latere acutis, altero obtusis vel saepius subauriculatis, margine dentatis, apice acuminatis, triplinerviis; stipulis lanceolatis, acute acuminatis, circiter 12 mm longis.

Staminate receptacles on very short peduncles or almost sessile, the peduncle bracted at the base: outer bracts orbicular-ovate, 8 mm long, corniculate, free from one another except at the base, inner bracts similar but only half the length of the outer; young flowers pedicellate, tetramerous: pistillate receptacles unknown.

Succulent, glabrous, erect, somewhat zigzag, usually unbranched, about 40 to 50 cm high: leaves subsessile, the lamina membranaceous, obliquely oblanceolate, 6 to 17 cm long, 22 to 46 mm wide, the lower often smaller than the upper, the acute side of the base terminating 4 to 9 mm from the stem, the other somewhat auriculate or at least obtuse, nearly always sessile, the narrower side usually entire below the middle, beyond with from 4 to 11 shallow serrations, the wider cut from below the middle into 8 to 16 slightly deeper serrations; the apex contracted into a slender acumen 1 to 2.5 cm long; triplinerved, with about 6 to 8 additional veins and others almost equally prominent; upper surface with conspicuous cystoliths, these much less conspicuous beneath but the surface punctate; stipules lanceolate or narrowly elliptic-lanceolate, 10 to 16 mm long, usually acutely acuminate.

Luzon, Province of Laguna, Mount Banajao, at 1500 m elevation, *Bur. Sci. 9856 Robinson.* Closely allied to *E. scriptum*, differing in the shape of the leaves, their venation, serration, and cystoliths, strongly resembling it in the stipules and receptacles. With this almost certainly belong two unnumbered collections made five years apart by Dr. E. B. Copeland at San Ramon, Zamboanga, Mindanao. Pistillate receptacles are present, sessile, up to 15 mm in diameter; the only staminate receptacle is younger than those of the type, but apparently the same; the leaves are very similar except that the veins are pubescent beneath. It would better have been made the type, but the only duplicates, those from Banajao, had been distributed under the above name.

21. **Elatostema palawanense** sp. nov.

Receptaculis sessilibus, staminiferorum bracteis exterioribus suborbicularibus, uno saltem conspicue sed breviter corniculato; floribus tetrameris: foliis crasse chartaceis, oblanceolatis ad obovatis, basis uno latere acutis vel subobtusis altero rotundatis vel breviter subauriculatis,

margine acute serratis, apice acuminatis; stipulis elliptico-lanceolatis, circiter 17 mm longis.

Staminate receptacles sessile; outer bracts suborbicular, 5 mm long, one or both distinctly short-corniculate, silky-pubescent; inner bracts oblong, 3.5 mm long, less densely pubescent; bracteoles narrowly oblong-oblanceolate, 3 mm long, pilose at the apex; pedicels about 1 mm long; perianth-segments 4, elliptic or broadly elliptic, nearly 2 mm long, more or less cucullate, pilose at the apex; anthers 0.8 mm long: pistillate receptacles sessile; outer pair of bracts free for over half their length, the free portions orbicular-ovate, 2.5 mm long, shortly corniculate, long-pilose and ciliate; other bracts oblong-lanceolate, 4 mm long, scarious-margined, strongly keeled but hardly corniculate, densely pubescent; bracteoles narrowly linear-oblanceolate, 3 mm long, long-ciliate especially at the apex; pedicels over 1 mm long; perianth distinctly either 3- or 4-lobed, minute: achene brown, broadly ellipsoid, obscurely striate, about 1 mm long.

Stems 30 to 40 cm high, erect except at base, the apices densely pubescent, below glabrous; leaves subsessile, the lamina densely chartaceous, oblanceolate to obovate, 6 to 10 cm long, 20 to 32 mm wide, the base acute or subobtuse on the narrower side, on the wider obtuse, rounded, or very shortly auriculate, the margins except at or near the base cut not deeply by acute teeth, strongly directed forward, on the wider side about 20 in number, the apex gradually or somewhat abruptly contracted into an acumen about 1.5 cm long, the upper surface scabrous, the under silky-pilose; triplinerved, with 4 or 5 additional veins, nearly free from one another; stipules elliptic-lanceolate, very shortly acuminate, appressed-pilose on the outer surface, about 17 mm long.

PALAWAN, Mount Victoria, at 1100 m elevation, *Bur. Sci. 677 Foxworthy.* Much more distinct from its nearest ally, *E. lagunense*, than it can be made to seem by key, the plants less coarse, the receptacles so far as can be judged from the present collection much smaller and differing in various details, apparently always sessile, and with the under surface of the leaves silky.

22. **Elatostema lagunense** Merrill in herb. sp. nov.

Monoicum vel saepius dioicum, erectum, succulentum: receptaculis staminiferis magnis, breviter pedunculatis; bracteis exterioribus depresso-orbicularibus, corniculatis; floribus tetrameris: receptaculis pistilliferis sessilibus, bracteis basi excepta connatis; floribus pedicellatis, perianthio minuto, trilobato: foliis oblique oblanceolatis vel obovatis, basis valde inaequilaterae uno latere acutis altero obtusis vel subauriculatis, margine basi excepta serratis, apice acuminatis, utraque pagina saepius strigosis, triplinerviis.

Monoecious or dioecious: staminate receptacles attaining a diameter of 2 cm, on short stout peduncles; outer bracts depressed-orbicular, nearly free, up to 9 mm in length and 13 mm in width, keeled, corniculate,

sparingly pubescent, the inner becoming smaller and obovate; bracteoles oblanceolate, 6 mm long, long-ciliate near the apex; perianth-segments 4, about 3 mm long; anthers becoming nearly 2 mm long: pistillate receptacles sessile, up to 14 mm in diameter; bracts united at their bases, free and stellately arranged along the margins of the receptacles, the free portions lanceolate to ovate, 3 to 4 mm long, densely ciliate and somewhat pilose on the back, slightly corniculate; bracteoles linear-oblanceolate, 3 mm long, long-ciliate; flowers very numerous, shortly pedicellate; perianth 3-lobed, about 0.1 mm long; achene brown, 0.6 mm long, longitudinally striate.

Adult plants very succulent, the younger less so, the stems angled and grooved, 30 to 80 cm high, strigose especially toward the apex: leaves subsessile, the lamina subchartaceous, obliquely oblanceolate to obovate, 6 to 25 cm long, 2 to 9.5 cm wide, very inequilateral at the base, one side acute or more rarely obtuse ending 5 to 10 mm from the stem, the other subauriculate, or more rarely merely obtuse, the narrower side entire for about half its length, then with 5 to 12 serrations, the serrations of the wider side usually beginning much nearer the base and 12 to 20 in number, not deep in proportion to the size of the leaves, the apex forming an acute acumen, often scabrous on both surfaces, especially beneath, or the pubescence softer and appressed, the upper surface also with numerous conspicuous long cystoliths; triplinerved or the nerve of the narrower side subbasal, other veins 4 to 6, all uniting by frequent anastomoses; stipules lanceolate, up to 17 mm long.

Luzon, Province of Nueva Vizcaya, Quiangan, *Merrill 206*, part: Province of Bataan, Mount Mariveles, *Whitford s. n.:* Province of Laguna, Los Baños, *Merrill 5118* (type), *Elmer 8313*, *Phil. Pl. 262 Robinson*, *Bur. Sci. 6735*, *9907 Robinson;* Mount Maquiling, *Merrill 7133:* Province of Tayabas, Mount Binuang, *Bur. Sci. 9466 Robinson;* Lucban, *Elmer 9203.* Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 411.*

The spurs upon the staminate bracts are most conspicuous in young receptacles, as they do not increase proportionally, and might be overlooked on superficial inspection of dried mature material. The species has much the appearance of *E. cupreo-viride* Rech.,[35] but is larger, with very different stipules.

23. **Elatostema lanaense** sp. nov.

Monoicum vel dioicum: receptaculis staminiferis sessilibus, bracteis exterioribus orbiculari-ovatis, carinatis, corniculatis, pilosis, ciliatis: floribus tetrameris: receptaculis pistilliferis adhuc juvenilibus, sessilibus: foliis sessilibus, membranaceis, oblique obovatis, basis uno latere acutis vel obtusis altero obtusis vel subauriculatis, margine grosse paucidentatis, apice breviter vel longiuscule acuminatis.

Staminate receptacles sessile, up to 9 mm in diameter; outer pair of bracts orbicular-ovate, keeled, corniculate, pilose, ciliate, free from one

[35] Fedde, Rep. Nov. Sp. **6** (1908) 49; Bot. Zool. Ergeb. Samoa. Neuguinea, u. Salomoninseln **3** (1910) 101, *pl. 8.*

another except at the base; next two pairs oblong-obovate, nearly as long as the outer, keeled, not or barely corniculate, ciliate-serrate; bracteoles oblanceolate, 3.5 mm long, ciliate or ciliolate; flowers shortly pedicelled; perianth-segments 4, ovate, 1.5 mm long, with long, ciliate spurs; anthers 0.7 mm long: pistillate receptacles still young; as seen the outer pair of bracts about 2 mm long, orbicular-ovate or wider than long, pilose, one or both slightly corniculate; the next pairs narrowly oblanceolate; flowers apparently typical, the stigma long-pilose.

Erect except at base, about 20 to 25 cm high, the stems densely pubescent at the apex and often lower: leaves sessile, the lamina membranaceous, obliquely obovate or elliptic-obovate, 3 to 6.5 cm long, 12 to 28 mm wide, the base inequilateral, acute or subobtuse on one side, obtuse or subauriculate on the other, the narrower side usually with 2 or 3 teeth, the wider with 4 or 5, the apical tooth forming an acumen over 1 cm long or on younger leaves much shorter and hardly projecting beyond the general outline; tri-triplinerved, the nerve of the narrower side sometimes little longer than the 2 or 3 veins; the glabrous upper surface with conspicuous cystoliths, the under pubescent on the veins with much less conspicuous cystoliths; stipules narrowly oblong-lanceolate, acute, 3 to 4 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 405.* Very similar in general appearance to *E. luzonense,* but differing by its sessile receptacles and otherwise.

24. **Elatostema scriptum** sp. nov.

Erectum, succulentum, caulibus tetragonis, plus minusve alatis, glabris: receptaculis staminiferis breviter pedunculatis, bracteis exterioribus interioribusque orbicularibus vel late ovatis, corniculatis; floribus tetrameris: foliis membranaceis, subfalcatis, oblique et saepe anguste lanceolatis vel ellipticis, margine dentatis, apice acuminatim protractis, subpinnatinerviis.

Dioecious, as far as known: staminate receptacles on sparingly pilose or glabrous peduncles 1 to 3 mm long; outer bracts free except at the base, orbicular or broadly ovate, on the largest receptacles about 9 mm long, rounded at the apex, distinctly corniculate, somewhat pilose on the outer surface or glabrous, the spur ciliate; inner bracts similar, somewhat smaller; flowers shortly pedicellate, perianth-segments 4, hyaline, 1 mm long, with a ciliate spur of nearly equal length.

Erect, succulent, the glabrous stems 20 to 30 cm long, quadrangular and more or less winged (very imperfectly shown by dried material), simple or more rarely branched: leaves sessile, the lamina membranaceous, obliquely and often narrowly lanceolate or elliptic, more often subfalcate, 7 to 13 cm long, 1.2 to 3 cm wide, the upper usually the longer, base of the upper side acute, of the lower acute or very shortly

auriculate, the teeth of the upper side 4 to 6, of the lower 4 to 11, acute or obtuse, on narrow leaves very shallow, on wider leaves deeper, on the upper side usually not below the middle of the leaf, on the lower side often occurring somewhat lower, terminal tooth triangular-lanceolate, acute, 15 to 20 mm long; both surfaces glabrous or the principal veins of the under obscurely pilose, upper surface when dry somewhat purplish, the under paler, both showing numerous long but not crowded cystoliths, these especially evident on the under surface by reason of the contrast in color; almost pinnately veined, the basal nerves present, but on the upper side close to the margin and on narrow leaves inconspicuous, on both sides soon connecting with the succeeding veins, numbering usually 8 or 9, with others intervening; stipules triangular-ovate or triangular-lanceolate, 10 to 12 mm long, hyaline except on the costa, acute.

Luzon, Province of Laguna, Mount Banajao, at about 800 m elevation, *Bur. Sci. 9766 Robinson.*

25. **Elatostema spinulosum** Elmer Leafl. Philip. Bot. 2 (1908) 468.

Erectum vel recumbens, caulibus angulatis et foliis praesertim subtus spinulis acutis haud urentibus horridis: receptaculis staminiferis sessilibus, bracteis exterioribus orbicularibus, tricarinatis, corniculatis, floribus trimeris (?) vel tetrameris; receptaculis pistilliferis sessilibus, 1.5 cm diametro, bracteis exterioribus ad medium coalitis, corniculatis: foliis subsessilibus, sicco subchartaceis, oblique oblanceolatis vel obovatis, inaequilateralibus, circiter 20 cm longis, 5 ad 9 cm latis, lateris angustioris basi acutis, latioris subauriculatis, ima basi excepta dentatis, sed lateris angustioris dimidia basali parte minute, supra grosse, apice abrupte acute acuminatis, utrinque glabris et cystolithis notatis sed subtus minus conspicue; triplinerviis, venis 4 ad 7 et reticulis subtus conspicuissimis.

Negros, Cuernos Mountains, *Elmer 9776* (type collection): Canlaon Volcano, *Phil. Pl. 233 Merrill.*

The staminate flowers are stated in the original description to be either 3-merous or 4-merous. As the occurrence of 3-merous flowers in the genus would be of especial interest, a number were examined from each of the collections cited, those from Canlaon being preserved in alcohol; all were 4-merous. The pistillate receptacles seen were oval rather than orbicular in outline, the central part formed by the united bracts being about 1 cm long, 7 mm wide, with the free portion of the outer bracts triangular-ovate, 3 mm long, of the inner bracts lanceolate.

Local name (Cuernos Mountains): *handalumog.*

26. **Elatostema whitfordii** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 48.

Luzon, Province of Bataan, Mount Mariveles, *Whitford 254, For. Bur. 1234 Borden.* Mindanao, District of Davao, Mount Apo, *Elmer 10709.*

As stated in the original description, this species approaches *E. macrophyllum* Brongn. in many respects. Comparison with Javan material of the latter shows *E. whitfordii* to differ by having the margins of the entirely glabrous leaves cut into twice as many serrations, roughly 40 against 20, by the venation being

much more emphatically pinnate than in that species, the lowest veins being very much shorter than the upper; the outer bracts of the staminate receptacles are united except toward the margins, and the pistillate receptacles, recently collected on Mount Apo, are peduncled.

Local name (Apo): *rader*.

27. **Elatostema edule** sp. nov.

E. platyphyllum Merr. in Philip. Journ. Sci. **3** (1908) Bot. 404, non Wedd. in Arch. Mus. Paris **9** (1856) 301.

E. platyphyllo Wedd. affine: receptaculis sessilibus vel subsessilibus, magnis; bracteis basi coalitis discum efformantibus, haud vel brevissime corniculatis; floribus staminiferis tetrameris: foliis breviter petiolatis, membranaceis, oblique elliptico-obovatis vel oblongis, basis uno latere acutis altero grosse auriculatis, apice acuminatis, triplinerviis; stipulis oblongo-lanceolatis, acutis, circiter 2 cm longis.

Staminate receptacles solitary, sessile or subsessile, up to 2 cm in diameter, glabrous throughout, the bracts united at their bases to form a disk about two-thirds the diameter of the receptacles, the free portions of the outer pair 4 mm long, 13 mm wide, broadly rounded, keeled but hardly corniculate; of the next two pairs about 5 mm long, 10 mm wide, keeled and slightly corniculate; bracteoles oblong-oblanceolate, 4 mm long, slightly corniculate; perianth-segments 4, 2.5 mm long, the outer broadly lanceolate, apiculate, the inner narrower: pistillate receptacles sessile, when flattened nearly oblong, up to 15 by 13 mm, the bracts fused but sufficiently free at least at their margins for the three outer pairs to be traced, all glabrous, barely corniculate; bracteoles linear-oblanceolate, 2 mm long, ciliate-serrate; perianth 3-lobed, about 0.15 mm long; achenes broadly ellipsoid, 0.5 mm long, obscurely striate.

Plants succulent, 50 cm or more in height, the vegetative parts glabrous: leaves shortly petioled, oblique, elliptic-obovate or oblong, 16 to 23 cm long, 3.5 to 9.5 cm wide, the base of the narrower side acute, that of the wider produced into an auricle retaining or slightly increasing the width of that portion of the lamina exterior to the nerve, the margin of the narrower side entire for a little more or less than half its length, then with from 7 to 12 teeth, that of the wider side with the lowest teeth nearer the base and 15 to 20 in number, the apex gradually or somewhat abruptly contracted into an acumen 1.5 to 2 cm long; triplinerved, additional veins 5 to 7; cystoliths very numerous and conspicuous on the upper surface, on the type-sheet especially so and of larger size along the principal veins, much less so beneath; stipules oblong-lanceolate, acute, about 2 cm long.

Batanes Islands, Batan Island, Santo Domingo de Basco, *Bur. Sci. 3609 Fénix* (type). Luzon, Province of Albay, Mount Mayon, *Bur. Sci. 6455 Robinson*. Formosa, Kotoshio, *Kawakami & Nakahara 1052*. The two northern collections are the closer match, those from Mayon having narrower leaves with smaller teeth, which are still far larger than those of *E. platyphyllum*, furnishing the

easiest means of distinguishing the species. Moreover, the staminate receptacles are solitary, nearly sessile, and their bracts are less completely fused: the cystoliths themselves and their arrangement are very different in the two species. The close alliance is undeniable. The leaves are eaten as greens in the Batanes.

Local name (Batanes): *reyrey.*

28. **Elatostema carinoi** W. R. Shaw in herb. sp. nov.

Monoicum vel dioicum, erectum, succulentum: receptaculis staminiferis breviter pedunculatis vel subsessilibus, magnis, bracteis basi coalitis, brevissime corniculatis; floribus tetrameris: receptaculis pistilliferis sessilibus: foliis membranaceis, oblique ellipticis, basi valde inaequilatera acutis vel subobtusis, margine dentatis, apice acuminatis, triplinerviis.

Staminate receptacles on peduncles usually stout up to 2.5 cm long, or more slender or subsessile, attaining a size of about 2 cm by 1.5 cm, the bracts as seen from without apparently 2, free nearly halfway to the base, but each of these formed by the union of an outer bract with the outer halves of one of each of the two next pairs of inner bracts, the inner halves of the latter embracing the flowers, dividing the receptacle into 4 parts, the free portions of the outer bracts in mature receptacles about 5 mm long and 9 mm wide, keeled, in young receptacles barely corniculate; pedicels about 1.5 mm long; perianth-segments 4, about 2 mm long, the outer pair oblong-ovate, corniculate, the inner pair oblong-lanceolate; filaments 2 mm long; anthers 1 mm, their cells widely diverging: pistillate receptacles sessile, about 1 cm in diameter, the margins revolute; bracts fused except at the margins, the free portions of the outer pair broadly triangular-ovate, 2 mm long, acuminate, ciliate, the others narrower; bracteoles linear or linear-oblanceolate, 2 mm long, strongly ciliate; pedicels about 0.5 mm long, perianth minute, 3-lobed; ovary ellipsoid, about 0.5 mm long; stigma pilose.

Erect, 35 cm to 1 m high, succulent, the stems glabrous or more often more or less pilose at the apex: leaves subsessile, the lamina membranaceous, obliquely narrowly to broadly elliptic, 6 to 12 cm long, 1.5 to 3.5 cm wide, strongly inequilateral, the base acute or on the wider side often obtuse, the margin of the wider side with from 8 to 12 teeth above about the basal third, the narrower usually with 7 or 8 in the apical half, the apex prolonged into a slender acumen 1 to 2 cm long; triplinerved, additional veins 4 to 6; glabrous or the veins of the under surface pilose; stipules lanceolate to linear-oblanceolate, 8 to 13 mm long.

Luzon, Province of Bontoc, *Vanoverbergh 510:* Province of Benguet, *Bur. Sci. 2828 Mearns;* Baguio, *Phil. Nor. Sch. 428 Cariño* (type), *For. Bur. 4811 Curran:* Lusod-Bayabas trail, *For. Bur. 15752 Curran;* Bued River, *Merrill 4847:* Province of Nueva Vizcaya, Quiangan, *Merrill 206,* part. Siquijor, near San Antonio, *Merrill 7205.*

Although this has much resemblance to *E. longipedunculatum* Elmer, its closer alliance is with the species here identified as *E. longifolium* Wedd., as shown by the structure of the staminate receptacles, differing from the latter in the nature of its pubescence, the stipules, and the more delicate venation, with the veins

especially on the narrower side more strongly directed toward the apex. It is possible that two species are here included, differing from one another in the coarseness of the dentation and the pubescence, but it will take field-study to determine this with certainty. This is probably the closest of all the Philippine species to true *E. sessile* Forst.

Through the kindness of Dr. A. B. Rendle, of the British Museum of Natural History, a photograph has been obtained of the type specimen of *E. sessile* Forst., preserved in the herbarium of that institution. No one of our species is identical with it, *E. carinoi*, its nearest ally, differing by the distinctly longer leaf-acumen. (Plate II, Vol. VI.)

Local name (Baguio): *ngaluy*, the plants said to serve as food for deer.

29. **Elatostema angustatum** sp. nov.

Receptaculis sessilibus vel subsessilibus, solitariis vel binis, staminiferorum bracteis exterioribus tricarinatis admodum corniculatis; floribus tetrameris: foliis membranaceis, obliquę anguste lanceolatis vel rarius ovatis, basis valde inaequilaterae uno latere acutis altero subacutis ad rotundatis, margine dentatis, apice attenuato-acutissimis.

Monoecious or dioecious, the receptacles solitary or paired, sometimes one of each kind in an axil: staminate receptacles 3 to 4 mm in diameter. the outer pair of bracts free from one another except at their bases, broadly oval or suborbicular, 3.5 mm long, slightly ciliate, the back with usually 3 very distinct keels more or less projecting apically, the next pairs of bracts obovate, cucullate, corniculate, 3 mm long; bracteoles nearly hyaline, oblanceolate, cucullate, 2 mm long; perianth-segments 4, hyaline, ovate, 1 mm long, very shortly or not cucullate: pistillate receptacles up to 1 cm in diameter; bracts fused in the basal half, the outer pair triangular-ovate, 1.5 mm long, slightly ciliate, keeled-corniculate, the others similar but narrower; bracteoles linear-oblanceolate, 2 mm long, ciliate-serrate; flowers shortly pedicelled; perianth-lobes 3, minute; achenes 0.6 mm long.

Erect, succulent, 20 to 40 cm high, glabrous except as noted for the inflorescence: leaves subsessile, the lamina membranaceous, oblique, narrowly lanceolate or on short leaves wider, 3 to 16 cm long, 7 to 18 mm wide, the base acute on one side, subacute to rounded on the other, the narrower with from 6 to 14 shallow teeth usually confined to the apical three-fifths or half, the wider with from 6 to 20 and the lowest more basal, the apex very gradually narrowed to a very acute or rarely obtuse point or on shorter and broader leaves acuminate: triplinerved, the point of origin of the nerve of the narrower side often from 8 to 20 mm from the stem, the nerves on both sides forming a continuous and nearly straight lateral line united with the costa by 3 to 9 veins; cystoliths conspicuous on both surfaces; stipules linear-lanceolate, 1.5 to 2.5 mm long.

Luzon, Province of Rizal, Bosoboso, *For. Bur. 3266 Ahern's collector* (type): Province of Laguna, Los Baños, *Bur. Sci. 6614 Robinson.* As suggested to me by Dr. Gagnepain, the species has considerable resemblance to *E. hookerianum* Wedd., but differs in its much more attenuate leaves with less auriculate bases and more numerous serrations, in the cystoliths and the stipules.

30. **Elatostema apoense** Elmer Leafl. Philip. Bot. 3 (1910) 885.

Dioicum, monoicum, vel floribus staminiferis pistilliferisque in eodem receptaculo intermixtis; bracteis exterioribus saepe inaequalibus, orbiculari-ovatis, usque ad 3.5 mm longis, obscurissime corniculatis, pilosis, ciliatis; bracteolis oblanceolatis, 3 mm longis, longe pilosis; floribus breviter pedicellatis; perianthio staminifero 4-partito, ovato, apice longe ciliato; perianthio pistillifero minuto, trilobato, acheniis 0.7 mm longis: terrestre, succulentum, plus minusve ramosum, caulibus a basi ad apicem dense pubescentibus; foliis sessilibus, laminis chartaceis, inferiorum saepe oblique lanceolatis, superiorum longioribus sed angustioribus, lineari-lanceolatis vel anguste lanceolatis, 3 ad 6 cm longis, 2 ad 7 mm latis, basis uno latere acutis vel subobtusis altero rotundatis vel subauriculatis, margine pro rata grosse dentatis, inferioribus apice obtusis, superioribus sensim vel acuminatim protractis, pagina superiore glabris inferiore venis pubescentibus, utrinque cystolithis notatis, trinerviis, venis 4 ad 6, subtus conspicuis; stipulis lanceolatis, apice protractis, 5 ad 8 mm longis.

MINDANAO, District of Davao, Mount Apo, at 1200 m elevation, *Elmer 11793*. This seems distinct from *E. lineare* Stapf in the venation of the sessile leaves, and is quite different from *E. rupestre* Wedd., to which Stapf says that his species is allied. The most curious thing about this species, the presence of pistillate and staminate flowers in the same receptacle, is of no diagnostic value: of three receptacles dissected by me, one was entirely staminate, a second entirely pistillate, while in the third the attached staminate flowers were more central and the attached pistillate flowers more peripheral.

31. **Elatostema longifolium** Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 189.

LUZON, Province of Nueva Vizcaya, Mount Umuguen, *Bur. Sci. 8186 Ramos:* Province of Laguna, Calauan, *Cuming 456;* Los Baños and vicinity, *Bur. Sci. 9675, 9906, 9916 Robinson.*

On our specimen of *Cuming 456* there are parts of two plants, the one with narrower leaves, more acutely serrate, the other with wider leaves more obtusely serrate: they may be different forms of the same species, but nothing has recently been collected to match the narrower-leaved form. The point would not be mentioned were it not that Weddell's description seems to be based upon the narrower-leaved type, whereas all the additional collections here cited agree well with the broader-leaved. The leaves are oblique and very inequilateral; if the narrower side were as wide as the other, the most usual shape would be oval. On this conception of the limits of the species, it approaches closely to *E. ulmifolium* Miq., reduced by Weddell to varietal rank under *E. sessile*, but with leaves of thicker texture, having the serrations fewer and much less closely set. A still nearer match is *Dr. King's collector 521*, from Coping in the Malay Peninsula, named as *E. sessile*, differing chiefly in the nature of the pubescence and less definitely in the texture of the leaves and the stipules. It is very much nearer to any of the Indian and Javan specimens in this collection named as *E. sessile* than is *E. brongniartianum*, which Weddell made a variety of that species. Ignoring here generic questions, discussed elsewhere, it may be worth while to discuss the validity of the name *E. sessile*. The entire specific diagnosis,[36] the first species being a *Procris*, is "*Sessile*. 2 E. tetrandrum." In the Prodromus (1786),

[36] Forst. J. R. & G. Char. Gen. Pl. (1776) 106.

the younger Forster gave a fuller description but renamed it *Dorstenia pubescens*. Persoon,[37] while citing *E. sessile* as a synonym, and only by implication referring to its later designation, named it *Elatostema pubescens*. A strict construction of the rules, would reject *E. sessile* in favor of *E. pubescens* (Forst. f.) Pers. The quotation might seem to imply that E. tetrandum was the specific name intended by the Forsters, but this is certainly not the case.

It is possible that the wider-leaved plants referred to above may represent the missing *E. tomentosum* Wedd., which would very satisfactorily explain its later reduction by its author to *E. sessile*. The narrower-leaved plant, at least in this herbarium, seems quite immature, it is possible that it may be a young plant of what is here named *E. angustatum*, but so far as present collections can decide the matter, the stipules seem to prohibit such a conclusion. However, these are also absent from the broader-leaved plants of Cuming's collection.

32. **Elatostema plumbeum** sp. nov.

Receptaculis staminiferis sessilibus, bracteis exterioribus orbiculari-ovatis, subcorniculatis; floribus tetrameris: receptaculis pistilliferis sessilibus; bracteis exterioribus late orbiculari-ovatis, breviter corniculatis, ceteris lanceolatis vel oblongo-lanceolatis: erectum, simplex, caulibus dense retrorse subappresse strigosis; foliis oblique et anguste ellipticis vel oblanceolatis, basis uno latere acutis, altero subariculatis, margine crebre dentatis, apice acuminatis; stipulis lanceolatis, acutis, circiter 3 mm longis.

Monoecious or dioecious: staminate receptacles sessile, outer bracts orbicular-ovate, free from one another except at the base, 3.5 mm long, pilose, ciliate, thickened except at the apex and margins, barely corniculate; next pairs nearly as long, much thinner in texture, obovate, ciliate, barely corniculate; bracteoles narrowly oblong-oblanceolate, corniculate; perianth-segments 4, excluding the apical hairs about 1 mm long, oblanceolate; anthers 0.6 mm long: pistillate receptacles sessile; outer bracts free nearly to base, about 2 mm long, 3 mm wide, broadly rounded, somewhat corniculate; other bracts numerous, lanceolate or oblong-lanceolate; all pilose and ciliate; bracteoles oblanceolate, excluding the dense apical tuft of hairs 1.5 mm long; perianth-lobes 3, often long for the genus, up to 0.2 mm; achenes brown, ellipsoid, 0.6 mm long, coarsely longitudinally striate.

Erect except at base, succulent, unbranched, about 20 to 30 cm high, the stems densely retrorsely short-strigose: leaves subsessile, the lamina membranaceous, obliquely and narrowly elliptic or oblanceolate, 5 to 8 cm long, 12 to 20 mm wide, one side of the base acute or subobtuse, the other shortly auriculate, the margins except at the base with crowded, curved, often apiculate teeth, about 30 on the wider side, somewhat fewer on the narrower, the lowest minute, the apex gradually contracted into an acumen 1 to 1.5 cm long, definitely triplinerved, the nerve of the narrower side more often arising over 8 mm from the base, additional

[37] Syn. Pl. 2 (1807) 557.

veins 6 to 8 on the wider side; fewer on the narrower, but with others subparallel to them nearly as prominent; upper surface sparingly pilose with numerous cystoliths, under densely pilose; stipules lanceolate, acute, about 3 mm long.

LUZON, Province of Benguet, *Bur. Sci. 3495 Mearns.* At first sight appearing to be a succulent, unbranched, large-leaved form of *E. benguetense*, but sufficiently distinct to ensure its ready recognition, and also possessing many additional points of separation. Both of these have been carefully compared with the descriptions of *E. tomentosum* Wedd., afterwards made by him a variety of *E. sessile*, a species that can not be identified at present: both seem to come near to it, but not sufficiently; however, it is to *E. benguetense* that it seems to approach most nearly of all our species.

33. **Elatostema contiguum** sp. nov.

E. obtusiusculo affine, sed differt foliorum apice longiuscule serrato-acuminatis, basi cuneata, dentibus minus obtusis, venis admodum pluribus.

Staminate receptacles (only one seen, that young) sessile; outer bracts free from one another except at the base, depressed-orbicular, 3 mm long, 4 mm wide, broadly rounded and not corniculate at the apex, somewhat pilose and ciliate; inner bracts oval, 2 mm long, not corniculate, densely ciliate; bracteoles oblong-oblanceolate, 2 mm long, densely pilose and ciliate; perianth-segments 5, lanceolate, pilose at the apex, hardly corniculate: pistillate receptacles sessile; outer bracts triangular-ovate, free for about 2 mm, very shortly corniculate, ciliate, somewhat pilose; other bracts oblong-lanceolate, densely pilose-ciliate; bracteoles linear-oblanceolate, excluding the pilose apex about 0.8 mm long; perianth somewhat unequally 3-lobed, usually over 0.1 mm long; achenes ovoid, 0.6 mm long, pale with about 8 brown longitudinal lines.

Erect, somewhat succulent, more or less tufted, not or sparingly branched, the stems with short dense appressed substrigose pubescence: leaves very shortly petioled or the upper subsessile, the lamina firmly membranaceous, obliquely elliptic or elliptic-oblanceolate, 5 to 9 cm long, 14 to 24 mm wide, or some of the basal reduced, the base acute or subacute on both sides or rarely rounded on the wider, marginal teeth about 20, usually more acute and spreading than in *E. obtusiusculum*, the apex protracted into a definite subcaudate serrate acumen 1 to 2 cm long; triplinerved, with 6 to 8 additional veins and others nearly as prominent, forming a continuous lateral vein; cystoliths crowded on the glabrous upper surface, inconspicuous on the pilose under surface; stipules lanceolate, acuminate, ciliate, 3 to 4 mm long.

LUZON, Province of Tayabas, Mahabangsugsugan River, *Bur. Sci. 9479 Robinson.* In addition to the characters noted as distinctive between this and *E. obtusiusculum*, there are probably others to be found in the staminate receptacles, but those of *E. contiguum* are too young to permit positive statement.

34. **Elatostema obtusiusculum** sp. nov.

E. brongniartiano valde affine, sed differt foliis longioribus, magis serratis, venis validioribus, latere latiore continuis, vel subcontinuis.

Staminate receptacles sessile: outer bracts orbicular-ovate, 2 mm long, acuminate, shortly corniculate; the next shorter, ovate, shortly corniculate, ciliate; bracteoles narrowly oblong, about 1.5 mm long, sparingly ciliate; perianth-segments 5, oblong-oblanceolate, 1.5 mm long, the spurs very unequal, up to 1 mm long; filaments slightly exceeding perianth; anthers white, 0.6 mm long: pistillate receptacles sessile; bracts united at base, the free portion of the outer pair ovate, 1 mm long, slightly corniculate, ciliate; the others lanceolate, pilose, ciliate; bracteoles linear-oblanceolate, 1 mm long, densely pilose at the apex; flowers still young, apparently perfectly typical.

Erect except at base, usually tufted, somewhat succulent, 10 to 25 cm high, the stems densely covered with short, stiff, brown and gray, nearly appressed hairs: leaves subsessile, the lamina rather firmly membranaceous, obliquely elliptic or elliptic-oblanceolate, 3 to 6 cm long, 13 to 23 mm wide, the base obtuse or subacute on the narrower side, shortly auriculate on the wider, the margins except at the base serrate, the teeth coarse, about 20 in number on full-sized leaves, usually thickened-apiculate, leaf-apex not or barely projecting beyond the general outline, obtuse; triplinerved, with 4 to 6 additional veins, all strongly projecting on the under surface, the veins of both sides strongly arched-anastomosing with the succeeding, nearly always forming a continuous line from base to near the apex of the leaf, finer reticulations numerous, sufficiently conspicuous; cystoliths crowded on the glabrous upper surface, inconspicuous on the under, which is appressed-strigose on the veins; stipules lanceolate, deciduous-apiculate, 2 to 3 mm long.

Luzon, Province of Tayabas, Mahabangsugsugan River, growing on rocks at an elevation of from 100 to 150 m, *Bur. Sci. 9480 Robinson* (type): Province of Camarines, Maagnas, *Bur. Sci. 6359 Robinson*, fragmentary, but differing only by having the apparently younger leaves more pubescent. This approaches closely to large specimens of *E. brongniartianum*, such as *Copeland 288*, but seems to differ from all collections of that species in the characters above noted and in the nature of the stem-pubescence. Only after long hesitation, is it published as distinct from that species and the succeeding. *E. contiguum* is its near neighbor both in systematic position and in habitat, the types coming from similar situations less than 1 Km apart. In the field they were sufficiently distinct to be gathered as such without hesitation, and they can at once be separated by the leaf-apices and bases, and less definitely by the more acute leaf-teeth and slightly more numerous veins of *E. contiguum:* however, they are closely allied, both falling in the *E. sessile* alliance, though distinct enough from its typical forms.

35. **Elatostema brongniartianum** Wedd. in Ann. Sci. Nat. Bot. IV 1 (1854) 190.

E. sessile var. *minus* Wedd. in Arch. Mus. Paris 9 (1856) 294.

E. sessile var. *brongniartianum* Wedd. in DC. Prodr. 16[1] (1869) 173.

Luzon, Province of Bataan, Mount Mariveles, *Williams 260*, *Copeland 288*, *Whitford 174*, part: Province of Laguna, Calauan, *Cuming 629* (type collection); Mabalucbaluc, *Bur. Sci. 6057 Robinson;* Mount Banajao, *Bur. Sci. 6080 Robinson.* Negros, Canlaon Volcano, *Merrill 6908.*

Cuming 629 was a mixture, and both species under which it was cited are represented on the sheet in this herbarium. From Weddell's key, they might be expected to differ in the leaf-apex, but in this they are very similar, the distinguishing characters given in the description being the cystoliths and the color of the leaves. The other collections here cited are good matches for the cotype, some having rather larger leaves, others narrower ones: the longest leaf on the cotype is 2 cm long, on any other 3.5 cm; the greatest width is 14 mm. This is almost sufficient in itself to justify a separation from a species with leaves 5 to 15 cm long, 2.5 to 6 cm wide, but there are additional characters. An apical leaf-tooth is present, as in almost every other species of the genus, this but rarely and then barely projects beyond the general outline of the leaf, whereas in the 7 sheets in this herbarium from Java and India, of *E. sessile* and species referred to it as varieties by Weddell, the apex is always very distinctly acuminate. The Philippine plants are also more pubescent, and the lateral veins are usually 3 or 4 on the wider side of the leaves. For the identification of *E. sessile* var. *minus*, I am indebted to Dr. F. Gagnepain, of the Muséum d'Histoire Naturelle, Paris, who writes that the labels on the sheets in that herbarium are so changed, in Weddell's own handwriting.

Weddell attributes this species to India and Australia also; there is no reference to it in *Flora Australiensis:* the Indian plant was *E. reptans* Hook. f.[38]

36. **Elatostema variegatum** sp. nov.

Receptaculis pistilliferis sessilibus, bracteis omnibus subsimilibus, oblongo-lanceolatis: suberectum, caulibus dense pubescentibus; foliis membranaceis, variegatis, oblique oblanceolatis ad obovatis, apice haud vel vix acuminatis, triplinerviis, stipulis anguste oblongis, apiculatis, 3 mm longis.

Pistillate receptacles sessile, about 4 mm in diameter; bracts more or less fused at the base, the outer similar to the others, oblong-lanceolate, 1 mm or slightly more in length, ciliate, not or barely corniculate; bracteoles narrowly oblong-oblanceolate, slightly over 1 mm long, densely pilose at the apex; perianth typical; achenes ellipsoid, about 0.5 mm long, pale with faint brown longitudinal lines.

Nearly erect from a creeping base, 8 to 12 cm high, the stems very densely covered with cinereous and fulvous substrigose spreading pubescence: leaves very shortly petioled or subsessile, the lamina membranaceous, beautifully variegated when fresh with light- and dark-green, less conspicuously so when dried, oblanceolate to obovate, 12 to 36 mm long, 8 to 12 mm wide, with other reduced leaves, the base acute or subobtuse

[38] Fl. Br. Ind. 5 (1888) 568.

on the narrower side, rounded or very shortly auriculate on the wider, the margins entire for a little more or less than half the length of the leaf, thereafter with from 4 to 7 acute and often apiculate teeth on the wider side and 3 to 5 on the narrower, the apical tooth acute or subacute, hardly projecting beyond the general outline; triplinerved, with 2 to 4 additional veins on the wider side and 1 or 2 on the narrower, these and the nerves subparallel nearly free from one another; pilose on both surfaces without conspicuous cystoliths; stipules narrowly oblong, 3 mm long, apiculate.

LUZON, Province of Laguna, base of Mount Banajao at 800 m elevation, on rocks, *Bur. Sci. 9767 Robinson.* Nearest to *E. brongniartianum*, but besides the color of the leaves, having much freer venation, with the base entire for a greater distance.

37. **Elatostema benguetense** sp. nov.

Sublignosum, ramosum, dioicum: receptaculis sessilibus, staminiferorum bracteis haud corniculatis, floribus tetrameris: foliis sessilibus, firmiter membranaceis, plus minusve oblique ellipticis, anguste oblongis, vel lanceolatis, margine basi excepta dentatis, haud acuminatis, triplinerviis; stipulis lanceolatis, 1 ad 1.5 mm longis.

More often dioecious: staminate receptacles sessile; outer bracts free except at base, about 2.5 mm long, 3.5 to 4 mm wide at base, the apex broadly rounded, the keels not reaching the apex, sparingly pilose and densely ciliate; inner bracts broadly oblanceolate, 3 mm long, ciliate at the apex, not corniculate; bracteoles similar but narrower; perianth-segments 4, broadly oblong to lanceolate, 1.5 mm long, shortly corniculate, ciliate at least at the apex; anthers about 1 mm long; pistillate receptacles sessile; outer bracts suborbicular, free for about half their length, broadly rounded, not corniculate, about 1.5 mm long, other bracts obovate, equally long, densely ciliate; bracteoles similar but narrower; perianth minute, 3-lobed, glabrous or more or less ciliate; ovary very shortly stipitate, ellipsoid, 0.7 mm long, striate; stigma with deciduous white pubescence as long as itself; achenes 1 mm long.

Erect, much branched, 20 to 60 cm high, the lower part of the stem glabrous and woody, the upper densely short-pubescent: leaves sessile, the lamina firmly membranaceous, more or less oblique, elliptic, narrowly oblong, or lanceolate, 8 to 30 mm long, 2 to 12 mm wide, the narrower side of the base acute or subobtuse, the wider subauriculate, the margins except at the base with conspicuous but rather shallow teeth, or much more rarely merely sinuate, the teeth acute or somewhat blunt, directed forward, most often 8 on each side but varying from 6 to 12, or with fewer on reduced leaves, the terminal tooth 1 to 2 mm long, apiculate, but not extending beyond the general outline of the leaf; the upper surface glabrous or slightly pilose, with numerous cystoliths, the under

densely strigose on the veins or glabrous; triplinerved with about 4 additional veins; stipules lanceolate, 1 to 1.5 mm long.

LUZON, District of Bontoc, *Vanoverbergh 500:* District of Lepanto, Mount Data, *Merrill 4507:* Province of Benguet, Mount Pulog, *Merrill 6568, For. Bur. 16050 Curran, Merritt, & Zsckokke;* Pauai, *Bur. Sci. 4354, 4392 Mearns, Bur. Sci. 8434 McGregor;* Mount Tonglon (Santo Tomas), *For. Bur. 5006 Curran* (type), *Elmer 6563, For. Bur. 11100 Whitford:* elevations from 1900 to 2200 m.

Easily distinguished from *E. brongniartianum* by its habit, from *E. podophyllum* by the narrower leaf-bases and the different serration.

38. **Elatostema podophyllum** Wedd. Ann. Sci. Nat. Bot. IV 1 (1854) 189.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4355 Mearns, For. Bur. 14447 Darling:* Province of Tayabas, Mount Banajao, *Cuming 789* (type collection); Mount Banajao de Lucban, *For. Bur. 879 Klemme, Whitford 940;* (Infanta), Mount Binuang. *Bur. Sci. 9356, 9390 Robinson.* MINDORO, Mount Halcon, *Merrill 6171.* The second collection cited from Mount Binuang, collected at an elevation of 900 m, has some of the leaves quite entire. The Mindoro distribution is to be noted, as it is only one of several cases that have been made evident by recent explorations. Probably all three Banajao collections were from the same mountain.

The pistillate receptacles are now known: it may be sufficient to say that they are sessile, of small size, and conform in all respects to the general type of the genus: the staminate flowers are 4- or 5-merous.

Endemic.

39. **Elatostema halconense** sp. nov.

Receptaculis pistilliferis sessilibus; bracteis exterioribus subliberis lanceolatis, haud acuminatis: lignosum, ramis apicem versus dense pubescentibus; foliis membranaceis, oblanceolatis vel anguste ellipticis, margine utroque latere dentibus saepissime duobus gerentibus, apice conspicue acuminatis.

Pistillate receptacles sessile, small; outer bracts free nearly to base, lanceolate, about 1.5 mm long, barely or not corniculate, densely pilose and ciliate; inner bracts similar but narrower; bracteoles linear-oblanceolate, densely pilose at the apex; flowers shortly pedicellate; perianth minute, 3-lobed, more or less ciliate; ovary ovoid, about 0.4 mm long; stigma penicillate-villose.

Erect, 30 to 70 cm high, the stems woody, much branched except near the base, the branches and the upper part of the stem covered with dense somewhat appressed pubescence; leaves sessile or subsessile, the lamina membranaceous, oblanceolate or narrowly elliptic, 15 to 32 mm long, 5 to 10 mm wide, base of the narrower side acute, of the somewhat wider obtuse or very shortly auriculate, the basal half or two-thirds of the margins entire, then with usually 2 acute or obtuse teeth on each side, the acumen narrowly lanceolate, 5 to 13 mm long, acute, apiculate; the glabrous olivaceous upper surface with numerous cystoliths, under surface paler, appressed-pubescent on the veins, without conspicuous cys-

toliths; triplinerved, with 2 or 3 additional veins; stipules lanceolate. acute, pubescent, about 1.5 mm long, deciduous.

MINDORO, Mount Halcon, in ridge-forest at 750 m, *Merrill 5786.*

40. **Elatostema sublignosum** sp. nov.

E. halconensi affine, sed differt foliis longioribus, magis dentatis, caule ramisque densius pubescentibus.

Pistillate receptacles sessile, 2 to 3 mm in diameter: outer pair of bracts ovate, 1.5 mm long, obliquely short-corniculate, ciliate, pilose; other bracts narrowly oblong, otherwise similar; bracteoles linear-oblanceolate, 1.5 mm long, long-pilose; flowers shortly pedicellate; perianth about 0.1 mm long, 3-lobed; ovary elliptic, compressed, about 0.4 mm long; stigma penicillate-villose.

Erect, woody, especially as seen in dried material, 40 to 70 cm high, widely branching, the branches and the upper part of the stem densely covered with dirty-yellowish somewhat spreading pubescence: leaves sessile or subsessile, the lamina membranaceous, obliquely oblanceolate to elliptic, 1.5 to 13.5 cm long, 5 to 32 mm wide, the base of the narrower side acute or more often subobtuse, that of the wider rounded or very shortly auriculate, teeth of the wider side 3 to 6, of the narrower 2 to 5, most often 3, the acumen lanceolate, 7 to 35 mm long, acute or subacute; upper surface glabrous with very numerous cystoliths, the under fulvous-pilose; triplinerved, with 3 or 4 additional veins; stipules lanceolate, 2 to 4 mm long.

LUZON, Province of Laguna, Mount Banajao, *Bur. Sci. 9754* (type), *9859 Robinson;* Mabalucbaluc, *Bur. Sci. 6014 Robinson:* growing at elevations from 600 to 800 m. A Formosan specimen, no. 1260, is nearly identical.

41. **Elatostema baruringense** Elmer Leafl. Philip. Bot. 3 (1910) 890.

Receptaculis staminiferis saepe fasciculatis, sessilibus; bracteis exterioribus basin versus liberis, late ovatis vel oblongo-ovatis, 2 mm longis, haud corniculatis, pilosis, ciliatis; interioribus similibus, densius ciliatis; bracteolis lineari-oblanceolatis longe pilosis; perianthio 4-partito: foliis rigidiuscule membranaceis, oblique ellipticis vel oblanceolatis, 8 ad 13 cm longis, 24 ad 42 mm latis, pagina superiore costa excepta glabra, marginibus lateris latioris 9- ad 14-dentatis, apice acuminatis; triplinerviis, venis saepissime 5 vel 6 additis; aliter sicut in specie praecedente.

MINDANAO, District of Davao, Baruring River, in dense forests at 1,200 m, *Elmer 10916.*

This and the two preceding species are very closely allied, possibly having their nearest alliance among previously described species in *E. integrifolium* Wedd., from which the stipules and still more the details of structure of the staminate flowers keep them quite distinct. When compared with one another, it is equally obvious that they are very similar and yet not identical, but with the differences of such a nature that additional collections may serve to unite

them. The chief differences are in the pubescence and the number of leaf-teeth, characters apt to be variable, but the specimens from the various localities are fairly constant with one another. Superficially, there is considerable resemblance between *E. halconense* and *E. caudatum* Hallier,[39] but they are probably in quite different alliances: it is very probable that *E. thalictroides* Stapf[40] is much more closely allied, though quite distinct. From *E. lineolatum* Wight, which it greatly resembles, it can readily be distinguished by the stipules.

42. **Elatostema integrifolium** Wedd. in DC. Prodr. **16** [1] (1869) 179.

Procris integrifolia Don Prodr. Fl. Nepal. (1825) 61.

Elatostema sesquifolium Hassk. Cat. Hort. Bogor. Alt. (1844) 79.

Procris sesquifolia Reinw. ex Blume Bijdr. (1825) 511.

Elatostema cuspidiferum Miq. Pl. Jungh. (1851) 22.

MINDANAO, District of Davao, Mount Apo, *Elmer 10514:* Lake Lanao, Camp Keithley, *Mrs. Clemens 406:* District of Zamboanga, San Ramon, *Copeland 735.* PALAWAN, Malampaya, *Merrill 7248;* Point Separation, *Merrill 813.*

It would be very difficult to get a better description of the plants above cited than that given for this species by Weddell, yet they are not exactly matched by any of two Javan collections received under the name of *E. sesquifolium*, nor by two from India named *E. integrifolium*, nor are they quite identical with one another; although there can be no doubt of the very close alliance of all nine. Blume, the only writer who has described the pistillate flowers of this species, has done so in such a way that his plants could hardly belong in *Elatostema*. To that genus, the staminate receptacles show that all of the Philippine collections belong, but their pistillate receptacles are as yet unknown. Miquel, in describing *E. cuspidiferum*, which he as well as Weddell and Hooker later identified with *E. sesquifolium*, said that the staminate bracts were apiculate. They are not apiculate in the Philippine collections; Hooker describes them as rounded.

43. **Elatostema scapigerum** sp. nov.

Receptaculis staminiferis magnis, longe pedunculatis, pedunculis e plantae basi oriundis, receptaculis pistilliferis in foliorum axillis sessilibus: foliis admodum parvis, oblique lanceolatis ad obovatis, basis uno latere acutis altero rotundatis, margine dentatis, apice breviter vel haud acuminatis, subtriplinerviis.

Staminate receptacles on rather stout pubescent peduncles 6 to 8.5 cm long, arising in the axils of branches at or near the surface of the ground, 13 to about 20 mm in diameter; bracts strongly fused near the peduncle, free for about 2 mm along the margins, stellately arranged, lanceolate, pilose, acuminate but hardly corniculate, a single ovate outer one seen; perianth-segments 4, ovate, corniculate, 2.5 mm long, cucullate, pilose; filaments 4, 2 mm long, anthers 1 mm long: pistillate receptacles sessile in the axils of present or fallen leaves, up to 5.5 mm in diameter; bracts fused, the free portions lanceolate or oblong-lanceolate, about 1.5 mm long, ciliate-serrate; perianth 3-lobed, about 0.1 mm long; ovary ovoid, about 0.5 mm long, smooth or the achene somewhat striate.

[39] Ann. Jard. Buitenz. **13** (1896) 307, *pl. 27, f. 3.*

[40] Trans. Linn. Soc. Bot. II **4** (1894) 229, *pl. 19, f. B, 5–8.*

Stems apparently creeping with erect branches, up to 30 cm long, densely nearly appressed-pubescent: leaves subssessile, the lamina firmly membranaceous, inequilateral, obliquely oval or somewhat lanceolate or obovate, 15 to 26 mm long, 7 to 13 mm wide, one side of base rounded, the other acute, the narrower side with from 2 to 5 teeth, the wider with from 4 to 7, the apical tooth little or not projecting beyond the general outline of the leaf; sparingly pilose on the upper surface, strongly so beneath especially on the veins, the upper with numerous linear cystoliths, the under minutely punctate, subtriplinerved, the basal nerve of the narrower side distinctly longer that the usually 2 veins, on the wider side little or not longer than the 3 veins; stipules lanceolate, about 3 mm long.

LUZON, Province of Bontoc, *Vanoverbergh 587* (type). With this may belong *Merrill 4378*, Baguio to Ambuklao, Benguet, with immature pistillate receptacles. The position of the staminate peduncle is so entirely different from that in any other of our species that there is a bare possibility that it may prove a monstrosity, otherwise it is a perfectly typical *Elatostema*. The structure of the receptacles shows that it is not at all a primitive form, as is the case with a high proportion of our species having peduncled receptacles.

[*To be concluded.*]

REVIEWS.

A Research on the Pines of Australia. By Richard T. Baker, F. L. S, curator and economic botanist, and Henry G. Smith, F. C. S., assistant curator and economic chemist. With an introduction by the minister of public instruction, J. A. Hogue. Published by the authority of the government of the State of New South Wales. Technical Education Series, No. 16, department of education, technical education branch, technological museum, New South Wales. Folio. Cloth. Pp. xiv+458. 3 maps, LXXVII plates, 298 figures. Sydney, 1910.

This elaborate and profusely illustrated work is one of a series (see No. 13 on the Eucalypts of Australia and their Essential Oils) in which important groups of Australian plants are considered, the effort being to treat them systematically, with the aid of all available sources of information, whether biological or chemical.

The Australian and Tasmanian *Coniferae* are considered under eleven genera and thirty-eight species. The genus *Callitris,* with eighteen species, receives the most extended consideration. The authors express the belief that this genus contains what are perhaps the oldest living representatives of the order. They propose to place the genera *Callitris* and *Actinostrobus* in close proximity to *Araucaria* and *Agathis,* regarding the bracts of the cones in the first-mentioned genera as sterile sporophylls.

The presence of a manganese compound in the wood, leaves, bark and lamella of *Callitris* and the other genera is noted. It is suggested that the dark-colored, glistening substance filling the so-called resin-cells in the secondary wood of the conifers is in reality this compound. The work of the authors does not seem to me to be conclusive as regards this point. The consistent occurrence of manganese in various parts of *Callitris* and other Australian conifers is taken to mean that manganese is a necessary constituent in the production of the most complete growth of these species. This conclusion does not seem to the reviewer to be warranted. It is not sufficiently well shown that the manganese is beneficial.

The taxonomy of the group is not fully treated. This perhaps is due to the lack of literature mentioned by the authors in several places. There is noticeable in the work a certain regrettable looseness in the use of technical terms; for example, the term "pines" is used in the title

to refer to the conifers of Australia, when true pines do not occur in that region. In several places, as on pages 296, 331, 377, 427, the term *cells* is used where *bordered pits* are meant. The illustrations are, in the main, very good. Natural color photography has been used in the reproduction of some of the micro-sections. Unfortunately, some of the sections were too thick to make it possible to show much of detail in their reproduction.

F. W. F.

In addition to the botanical features of the book reviewed in the above paragraphs, there are many things which will arouse the interest of an organic chemist. The advantages accruing from the coöperation of botanist and chemist are well shown in the systematic method of treatment and the arrangement of the subject-matter.

The work on essential oils contains many noteworthy results, a few of which may be cited. The optical rotation of the terpenes of the oils from the leaves of some species of *Callitris* is in the opposite direction to that obtained from the fruits, even if collected from the same tree; some of the leaf oils contain a high per cent of geranyl acetate; guaiol occurs in the wood of most of the species of *Callitris*. A new phenol, named by the author, callitrol, has been isolated. Limonene is found in the majority of the species of the same genus associated with geraniol and geranyl acetate. *Athrotaxis selaginoides* Don yields limonene having the rotation $[\alpha]_D = +112.2°$; the oil distilled from *Dacrydium franklinii* Hook. f. contains a new terpene which the authors have termed dacrydene; methyl eugenol occurs to the extent of about 86 per cent in the oil distilled from the wood of *Dacrydium franklinii* Hook. f. A new diterpene was isolated from the oil yielded by *Phyllocladus rhomboidalis* Rich.

The large amount of material which the authors have examined is probably responsible for the fact that the experimental work appears to have been curtailed to the extent that serious doubts arise in the mind of the reader as to whether or not some of the compounds described were identified with sufficient exactness. More precise quantitative data would add considerable value to the book from the standpoint of a chemist, and it is probable that anyone interested in the commercial phases of the work would make the same criticism. For instance, it is suggested that *Agathis robusta* C. Moore may be a commercial source of turpentine, yet the average yield of oleo-resin per tree, the rate of flow of the resin, or the relative abundance of these trees in any given district is not stated.

B. T. B.

The Smuts of Australia. Their Structure, Life History, Treatment, and Classification. By D. McAlpine. Cloth. Pp. vi+288. Frontispiece. LVI plates, 15 text figures. Price, with postage, 4s. 9d. Melbourne: Department of Agriculture, 1910.

This work, a companion volume to "The Rusts of Australia," by the same author, has much more than a local value. It is so written as to be at once a scientific paper of great excellence, and to be within the grasp of everyone who is forced to combat a disease caused by species of the group. A short glossary gives explanations of the few terms likely to cause difficulty.

Descriptions are given of 68 species in 10 genera, practically all of them figured; 11 are new, there are several additional transfers, and a change of name which, however desirable it may be from one standpoint, is not in accordance with the present usage of workers in other groups. A very few of these are known from the Philippines.

The interest to those concerned with problems of more tropical regions is not so much in the purely systematic part of the work, as the extended discussions of many general problems, embodying the results of much recent work on the part of the author and of others, and in the descriptions of methods followed both in the investigations and in the practical treatment of the diseases. In this way, it will prove of the greatest assistance to all who are in any way interested in these destructive fungi in any country in the world. The life-histories are given, so far as known.

Criticisms must be of a very minor nature. The method of numbering the figures is somewhat confusing, and it would aid at least the reviewer to have the new species and combinations designated as such. There are a few cases where exception might be taken to the nomenclature. The paper is of good quality, and the proof has been very carefully read.

C. B. R.

ERRATA.

Page 86, line 10 from the top, for Thumb., read Thunb.
Page 128, line 7 from the top, for *Rhnychosia*, read *Rhynchosia*.
Page 144, last line, for **subullgerum**, read **subuligerum**.
Page 326, line 7 from the top, for **ANTHRAXON**, read **ARTHRAXON**.
Page 371, last line, for *T. oldhami*, read *R. oldhami*.

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(New genera and species and combinations published for the first time are in **black-faced type**; synonyms and species mentioned incidentally in the text are indicated by the page references being in italics.)

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